DEVELOPMENT OF A CONCEPTUAL FRAMEWORK RELATING TO READY-TO-WEAR CLOTHING FOR GHANAIAN WOMEN FOR MANUFACTURING STRATEGIES

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ABSTRACT

In recent years there has been a remarkable increase in anthropometric surveys taking place worldwide for development of sizing systems. It has been acknowledged that the extent to which one sizing system may be applied to different populations is limited due to the variability of body shapes and sizes. Various countries have developed their own sizing systems in order to reduce problems associated with clothing sizes and fit. This study established that no official anthropometric survey has been conducted in Ghana. The absence of any publication of a national sizing system, intended for clothing purposes has resulted in the need for a sizing system that will relate to Ghanaian women and satisfy their different body shapes.

This study was undertaken to develop a conceptual framework to facilitate the understanding of clothing sizes, body shapes and manufacturing strategies for the production of ready-to-wear for Ghanaian women aged between of 16-35 years. A mixed approach to research methods was adopted which incorporated interviews, focus group discussions, questionnaires and anthropometric survey to achieve the aims of the research after an extensive review of literature. The grounded theory approach was used to analyse the qualitative data to ascertain key issues related to sizing systems, body shapes and manufacturing strategies. Data was obtained from clothing manufacturers, stakeholders and consumers in Ghana using non-probability purposive sampling methods. Twenty clothing manufacturers and four stakeholders were interviewed. Four focus groups were formed for the discussions and 400 questionnaires were administered to consumers. Eight hundred and forty two Ghanaian women aged between 16-35 years were measured using the manual body measurement procedures. A quantitative approach using correlation and one-way ANOVA programmes from the Statistical Package for Social Sciences (SPSS) was used to determine the relationships among the variables and to obtain statistical information for the development of the sizing system. The grounded theory using an inductive approach was used to analyse the qualitative data from the interviews and focus group discussions. The findings of this study have implications for manufacturing strategy for clothing manufacturers for the Ghanaian market. A conceptual framework was developed to help facilitate the understanding of clothing sizes, body shape and manufacturing strategy for the production of ready-to-wear clothing. The anthropometric survey helped to develop a size chart for Ghanaian women aged between 16-35 years in order to improve well fitted and quality garments to satisfy consumer clothing needs. This study also established significant relationships between body shape, body cathexis and clothing. It contributes greatly to knowledge by providing a detailed procedure involved in developing a research based anthropometric, which will serve as the basis for other future national anthropometric surveys for men and children in Ghana as well as West Africa. This study also provides original baseline data for future research on body shape and body cathexis on Ghanaian women of all ages.

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DECLARATION

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of Manchester Metropolitan University or any other university or other institution of learning.

DEDICATION

To my husband, Peter Adu-Boakye for his endless support, love, encouragement, patience throughout my studies and to my sons, Samuel, David and daughters, Lois and Keziah Elizabeth.

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CHAPTER 1: Background of the Study

1.1 Introduction

Clothing worn by Ghanaian women have undergone changes from traditional wear to the adoption of western fashion. Dogbe (2003) attributes the change to the growth of new values, social institutions, and patterns of interaction in the urban areas in the 19th century. Clothing of Ghanaian women has transformed from traditional concepts to modified and combined traditional clothing and finally adaptation of western style. The mode of dressing was mainly wrapping two pieces of rectangular cloth called 'ntama' with or without a blouse around the body. This was later on developed into 'slit and kaba' described as long skirt and a blouse. The style changed to a straight loose clothing called 'boubou' made from a single piece of fabric with a neck opening or a maxi length clothing with a blouse and a broad 'ntama' and finally to the western current fashion. The modern Ghanaian woman's clothes reflected changing practices, cultural beliefs, and fashion trends in 1970's (Dogbe, 2003).

The introduction of education, migration, exposure to the western patterns of behaviour and the media facilitated the adaptation and modifications of Ghanaian traditional clothing to design patterns of western countries (Matthews, 1979). The traditional clothing were mostly produced using local fabrics and designs concepts while the western clothing adapted was produced with western fabrics and design concepts. Clothing production in Ghana was mainly customised by dressmakers or tailors until the introduction of ready-to-wear clothing when the use of mass production techniques started. Ghanaians started patronising publicised ready-to-wear clothing imported from other parts of the world especially UK and USA around the 1970's and 80's (Matthews, 1979).

The increase in consumer demand for ready-to-wear clothing worldwide enabled the mass production companies to take over the market globally (Dickerson, 2000). Since the introduction of mass production, sizing has been used in dividing standardised body and clothing dimensions into categories for speeding up and enhancing production and retailing of clothes (Beazley, 1997). Clothing standardisation has become necessary and an important issue of ready-to-wear clothing leading to the development of many different sets of body dimensions

having the same size designation (Dickerson, 2000). Clothing manufacturers developed their own sizing methods for women ready-to-wear clothing leading to great variation in sizes and much confusion (Winks, 1997). Clothing sizing from then on has evolved in a fragmented and competitive environment with little adherence to proposed systems for standardising body dimensions (Tamburino, 1992a). The industry in recent times has been challenged to satisfy customers with satisfactory clothing fit because of the high demand of extremely close body fitting of clothing (Otieno et al., 2005). The search for total satisfaction as a result of clothing fit problems has therefore resulted in a number of anthropometric studies and surveys to improve on the accuracy in data obtained (O'Brien and Shelton, 1941).

Many countries (USA, UK, Germany, Holland, China, Japan, South African and others) have conducted national anthropometric surveys leading to the developed sizing systems, which were based on their own populations in order to reduce clothing fit problems. A sizing system is created to find the optimum number of size groups, which describes many shapes and sizes divided into varied population and subsequently into homogenous subgroups. The US Department of Agriculture (O'Brien and Shelton, 1941; Yu, 2004c; LaBat, 2007) sponsored the first large-scale anthropometric women survey conducted in the USA in 1939-1940. Research has shown that anthropometric data collections need to be updated regularly because of changes that occur in the distribution of body dimensions in order to ensure the right measurements are used (Oborne, 1982; Roebuck, 1995). Research has also established that body shapes of women may differ from one geographical location to another due to different lifestyles, diets, socio-cultural values and ethnic composition of populations (Tamburino, 1992b; Chen and Swalm, 1998). Body shape and proportions within a population and age bracket are significant factors when considering clothing fit.

The need for practicable size charts for the production of ready-to-wear clothing has resulted in an increase in the development of new technologies to achieve fast and reliable body measurements data. A size chart presents the value of each of the body dimension used to classify the shapes encountered in the population of each group in the sizing system and are presented in a form of tables. Size charts used to produce fashionable clothing may not be a realistic representation of the majority of individuals in the society resulting in consumer dissatisfaction.

Anthropometric surveys conducted before the introduction of the two-dimensional (2D) and three-dimensional (3D) body scanners, used the manual measuring techniques, which involved the use of tape measure and callipers. 2D and 3D body scanners are the latest technology developed for anthropometric surveys. Based on the traditional methods and the new technologies that are emerging, several clothing standards have been developed by various countries, (USA, UK, Germany, the Netherlands, France, Japan, China and others) which are in use globally.

In Ghana, however, the absence of official national sizing system developed in Ghana has resulted in the clothing companies adopting or modifying size charts from different countries, most specifically USA, UK, and the International standard (ISO, 8559:1989) creating variations in sizes resulting in clothing fit problems. Research has identified clothing as remaining a culture-bound product group (Rosen and Louis, 1987; Usunier, 1993). Although globalisation has resulted in clothing companies trading standardised clothing across the world, presuming universal sizes, the differences in body shapes, sizes and proportions as a result of socio-cultural and geographical factors undermine the concept of globalisation. This therefore demands the use of different size charts that can cater for the clothing needs of specific groups of people. Otieno (1999) indicates that styles can be globally desired but sizing should be local. There is therefore the need for an anthropometric survey to be conducted in Ghana for specific demographic groups.

1.2 General Information on Ghana

Ghana is located in sub-Saharan Africa and occupies a land area of 238,538 square kilometres. It shares boundaries with its West African neighbours; Togo to the east, la Cote d'Ivoire to the west, Burkina Faso to the north and the Gulf of Guinea, to the south. It is unitary republic with sovereignty residing in the citizens by the 1992 constitution. The population in Ghana is estimated at 21 million with 44% of the population aged 0-14, 53% aged 15-64 and 3% aged over 65. The female population aged 15-49 years was about 3.5 million in 2000 (Ghana Statistical Service, 2005). The country is divided into ten regions with nine major ethnic groups comprising of numerous subgroups who share common cultural, linguistics, heritage, history and origin. The official language is English with over 60 linguistic groups. Christianity is the dominant religion in Ghana with 66.8%, followed by Islam with 16.5%, the others are traditional 9.2%, non-religion 7.4%

and other domain 0.1% (GSS, 2008). Ghana has a tropical climate characterised most of the year by moderate temperatures 21C- 32C (70F-90F), constant breeze and sunshine. It is warm and comparatively dry along the south eastern coast; hot and humid in the south-western and hot and dry in the north. There are two main rainy seasons, from March to July and from September to October, which is separated by a short dry season in August and a long dry season in the south from mid-October to March. Annual rainfall in the coastal zone averages 83 centimetres (33 inches).

1.2.1 Economic Environment in Ghana

The economy of Ghana has been growing steadily and is relatively high among African countries. The GDP growth rate increased from 4.0% in 2009 to 7.7 percent in 2010 (GSS, 2010). It consist mainly of three broad sectors; agriculture (36%), industry (25%), service (26%) and 13% for others in 2005. It is traditionally dependent on export of agricultural goods including cocoa, gold, diamond and other primary commodities. The industrial sector is made up of clothing companies (40%), furniture (20%), food and beverages (15%), and other manufacturing companies (25%). After more than a decade of unprecedented economic decline caused by external shocks, adverse macro-economic policies and natural disasters, the government of Ghana launched an Economic Recovery Programme (ERP) in 1985 to improve on the growth of the subsectors of the economy in an attempt to rescue the economy (Fianu and Zentey, 2000). The slow growth of manufacturing companies, of which the clothing industry is included, led to the introduction of New Industrial Reforms, the Accelerated Growth Programme and the Ghana Poverty Reduction Strategy (ICG, 2001). The National Development Planning Commission (NDPC) was established in 1990 to formulate a National development entitled Vision 2020, to expand the private sector of which the clothing sector was included to accelerate the growth of the economy (Fianu and Zentey, 2000).

1.2.2 Economic Contributions of the Clothing Industry in Ghana

Ghana has a relatively broad and diverse industrial base and the contribution of the manufacturing sector to GDP remains modest. The revenue from clothing exports was valued at USD 0.157 million in 1994, USD 1.01 million in 1996 and

USD 1.12 million in 1997 (Fianu and Zentey, 2000). These revenues accounted for 2.3% of the total value of non-traditional exports as reported by the Ministry of Trade and Industry in 2000. Boateng (1996) estimated that the clothing industry constituted about 60% of the informal sector employment in the urban centres. The National Industrial Census, conducted in 2003-2005, reported that 40% of the manufacturing sector was made up of the clothing industry, which held a greater share in the industrial sector with 24,133 clothing companies and 55,301 workers, which accounts for 22% of the country's total workforce (ICG, 2005).

The clothing industry is dominated with micro-small scale enterprises indicating a low value of production per employee. The micro-small scale enterprises according to United Nations Industrial Development (UNIDO) definition are companies which employ between 5-19 employees. In the bid to promote the economic growth, the President's Special Initiative was launched in September 2001 as a public/private partnership programme designed to develop new pillars of growth for the Ghanaian economy. The objectives of the initiative were to create more jobs within the clothing industry, establish and operate medium-scale manufacturing plants for clothing, help Ghanaian entrepreneurs to become merchant clothing exporters and help the small-scale tailors and seamstresses. According to Kuffour (2008), the government is now earning between USD 200,000 to USD 1 million per annum from the clothing industry. Although the productions of ready-to-wear clothing have been increasing, a significant factor that militates against the industry is the issue of clothing sizing because there is no official national sizing system. If this lucrative market is going to be developed further there is a need for anthropometric data to be gathered on the population to facilitate ready-to-wear production.

The second-hand clothing accounts for 60% of the domestic market (JICA, 2008). Baden and Barber (2005) indicate that, the global trade in second-hand clothing has grown 10-fold in 1990 to reach a value around $1billion annually. According to the Swiss Academy for Development (1997) report, 150,000 Ghanaians work (sorting, restyling, transporting, repairing and cleaning) in the second-hand clothing sector. With the growth of second-hand clothing consumption, fashion in many countries especially in Africa seem to be shifting from traditional 'African' clothing to more 'Western-styled' clothing which come in different size codes and ranges (Baden and Barber. 2005).

1.3 Context of the Current Study

This study was undertaken to develop a conceptual framework to facilitate the understanding of clothing sizes, body shape and manufacturing strategy for production of ready-to-wear clothing for Ghanaian women between the ages of 16-35 years. This has become vital because there is no official national sizing system developed based on the population of Ghana. The issue of well-fitting clothes and uniformity in clothing sizes is very significant for the production of ready-to-wear clothing. With the development of a size chart based on the Ghanaian population, the industry will be well equipped with an appropriate size chart for the local market. The utilisation of a local size chart will create competition among the ready-to-wear clothing companies, as the quality of clothing with regard to clothing fit will be improved.

This study will contribute to knowledge in the area of clothing sizes, body shapes and manufacturing strategies, which will have great implication for the development of the Ghanaian clothing industry. It will serve as the baseline for further research for the development of size charts to cater for all age groups of women, men and children in Ghana. This size chart can also be used to produce clothing for other African countries. Furthermore, it will contribute to the understanding of the dynamics of the body shape and body cathexis relating to clothing issues. Extensive research has been conducted on body shape, body cathexis and clothing on western women. However, very few surveys had been conducted for the African American and other African women with virtually no literature on Ghanaian women. This information gathered on body shapes of Ghanaian women will aid classification for the development of a size chart to solve the problem of clothing fit. The results obtained from the data collected for this study will help in the development of a conceptual framework that will facilitate the understanding of clothing sizes for manufacturing purposes. It will help in the production of ready-to-wear clothing to meet the rising demand of the current population and to respond to the expectation of the launched Presidential Special Initiative (PSI) on Garments and Textiles.

1.4 Aims of the Study

The principal aim of this study was to develop a conceptual framework to facilitate the understanding of clothing sizes, body shape and manufacturing strategies for

the production of ready-to-wear clothing in the Ghanaian market. The specific aims of this study are:

1. To analyse the current sizing systems used for the production of ready-to-wear in the clothing industry in Ghana.
2. To evaluate consumer perception of body shape, size and body cathexis and their effect on clothing choice.
3. To develop a size chart based on anthropometric body measurements of Ghanaian women aged 16-35 years.
4. To develop a conceptual framework that offers a better understanding of clothing sizes, body shape and facilitates manufacturing strategies for the Ghanaian clothing industry.

Chapter 2: Literature Review - Manufacturing Strategies of the Clothing Industry in Ghana

2.1 Introduction

The review of literature is divided into two separate Chapters (2 and 3). The first chapter discusses the manufacturing strategies of clothing industry in Ghana. Topics discussed in this chapter include the concept and strategies of manufacturing, overview of the global clothing industry, clothing industry in Ghana and the role of the textile industry. The second part focuses on the involvement of government agencies in Ghana and some private organisations in the Ghanaian clothing industry. The second chapter focuses on clothing anthropometrics and body shape.

2.2 The Concept and Strategies of Manufacturing

Greenhalgh (1991) states that the manufacturing companies globally combine technology, workforce and their strategy to succeed. New and emerging technology has replaced human effort and skills in manufacturing. Hounshell, (1984) concurs with Hayes and Wheelwright (1979) that machines have replaced human labour in traditional factories, simplifying production through standardisation and repetition thereby speeding production and reducing unit cost. According to Prabhaker et al (1995), there has been a significant economic gain in recent times due to the introduction of computers to all aspects of manufacturing. These authors (Chenhall, 1996; Sackett et al., 1997; Riis et al., 2007) are of the view that manufacturing organisations are faced with increasing competition from both foreign and domestic companies, which has called for growth in responsiveness to meet the needs of customers for innovative products. The result of technology now has sparked the search for more advanced technological way of doing things in the manufacturing sector in order to simplify, reduce cost and increase reliability and perfectionist (Prabhaker et al., 1995).

Greenhalgh (1991) indicates that companies can succeed if they have good manufacturing strategies in place as they provide direction, focus and serve as a vehicle to communicate to all levels of an organisation. Hill (1993, 2000) indicates that manufacturing strategy provides manufacturing processes, which will give the business a distinct advantage in the market place and provide coordinated manufacturing support for the essential ways in which products win orders in the

market place. Keong Leong and Ward (1995) suggest the Six Ps of strategy: planning, proactiveness, pattern of actions, portfolio of manufacturing capabilities, programmes for improvement and performance measurement offers a distinct view about the strategic intentions and capabilities of manufacturing. Hayes and Pisano (1994) identify four dominant manufacturing strategy paradigms as mass production, focused manufacturing, world class manufacturing and dynamic manufacturing. Contemporary manufacturing organisations are faced with two scenarios: newer manufacturing philosophies, technologies and today's customer behaviour (Rodrigues and Mackness, 1998; Power et al., 2001). In view of this, manufacturing organisations are required to act quickly in accordance with the surrounding competitive situations.

2.3 Overview of the Global Clothing Industry

Jones (2006) agrees with Dickerson (1995) that the clothing industry is the first industry to be established as industrialised and continue to be leaders in industrialisation. Lin et al (1994) states that, the act of sewing has been difficult to automate, productivity improvement has been slow making it a major concern for the clothing manufacturers. According to Lin et al (1994), the clothing manufacturing industry remains one of the most difficult and labour intensive of all factory operations. The authors (Dickerson, 1995; Keenan et al., 2004; Adewole, 2005; Jones, 2006) acknowledge that over the last decade the clothing industry has become increasingly capital-intensive, leading to dramatic falls in employment levels worldwide. According to Dickerson (1995), the clothing industry today does not resemble the clothing industry of 25 years ago because technology enables teams from around the world to work together without ever meeting face-to-face. She explains that communication system has made it possible for designs to be transferred from one country to the other for cutting and production to be done. Dickerson (2000) states that the new technology speeds up the product development process, preassembly operations, manufacturing processes and finishing operations reducing labour time.

The clothing production system is describe by Glock and Kunz (2005) and Lin et al (2002) as the integration of materials handling, production processes, personnel and equipment that change raw materials into finished products. Lin et al (2002) described the production system as the flow of goods through the system and the relationship of the workers to the equipment to each other. Production systems

that are used by the clothing industry are the bundle system, which is the oldest, and widely used, the Modular Production System (MPS) and Unit Production System (UPS). The introduction of computers in the clothing industry has transformed the clothing industry. According to Keenen et al (2004) the automated and computer-based manufacturing systems; the introduction of ICT automation through the use of CAD and CAM systems have changed and it is considered now as the tool of improvement of manufacturing speed and quality. Aldrich (2008) indicates that the way computer aided design (CAD) is used is changing as globalisation makes connectivity a priority throughout the manufacturing process used.

The demand for well-fitting and quality clothing of consumers today is posing a big challenge to the industry. Keenan et al., (2004) point out that in the competitive market where demand uncertainty and time to the market have become important factors alongside price, textile and clothing industries are being asked by their customers to provide many more products in smaller lot sizes with shorter lead times. In view of this development, Abernathy et al (1999) state that the clothing industry should use the new and emerging technologies rather than just drawing on the economies of scale that led to their success in the past. Dickens (1998) agrees with Dickerson (1995) that, the textiles and clothing industries were the first manufacturing industries to be involved in globalisation. Textiles and clothing industries accept that they are the most geographically dispersed of all industries across the developed and the developing countries. Dickerson (2007) states that globalisation has affected the clothing industry thereby breaking the production line in the industries. According to Dickenson (2007), goods are designed, made, sold at different locations and companies need to fit into a network that includes both competitor and partners. Dickens (1998) is of the view that competition has intensified in the clothing industries globally as the search for new, labour-saving technologies has increased. The clothing manufacturers are searching for better ways to solve the production and costing problems. Lin et al (1994) state that the cost involved in production has resulted in relocation of large-scale companies or companies operating as multinational to low-wage areas in order to reduce cost of production (Jones, 2006). According to Tyler (2003), for some developed countries like the UK, researchers have described the clothing industry as a “twilight industry” because of these moves. Adewole (2005) indicates that there has been a long-term decline of the clothing industry even though clothing forms one of the

most traditional and important industries in the UK. She attributes this to the high cost of running the clothing industry, production has moved to locations where cost could be minimised.

2.4 The Clothing Industry in Ghana

The clothing industry in Ghana is made of private enterprise owners who employ one to thirty or more workers (Chimieloweic, 1995), The Ministry of Trade and Industry in 1979 registered 138 medium and large-scale as well as numerous small scale clothing enterprises but in 1995 this figure reduced to 72 (Ampofo, 2002; Quartey, 2006). The authors attribute the decline of the industry's activity levels to some government policies. According to Boateng (1995), clothing manufacturing constitutes about 60% of the informal sector employment in the urban centres in Ghana. Current statistics gathered from the industrial census conducted between 2003-2005 shows that the clothing industry represented the largest share of around 40% with 24,113 registered companies and 55,301 workforce, which accounts for 22% of the country's total workforce in the industry (ISIC, 1810:2001). According to JICA (2008) report, the business administration, product development, production and sales of most of the clothing companies in Ghana are solely operated and managed by their owners. A few large retailers sell clothing items in large quantity as seen in the developed countries. The main production of the clothing industry include catalogue of items for children, women, men and other special items as well as uniforms for corporate bodies such as the banks, police army, other security services, schools, industries and governmental institutions and for export trade (Ampofo, 2002). Until recently, the production of clothing was mainly custom-made by clothing manufacturers in the micro and small-scale enterprises (MSSE) of the informal sector (Fianu and Zentey, 2000). The collapse of the large scale clothing industries was due to lack of quality and conformity of standards (Ampofo, 2002). Fianu and Zentey (2000) reveal that the clothing industry faces numerous challenges which include; lack of marketing outlet, capital, skilled labour, durable machines and difficulty in acquiring workshops. The authors suggest that government and other stakeholders should provide financial support for the companies to obtain modern equipment. Local manufacturers are faced with intensive competition with imports and used clothes. It is reported that second-hand clothes account for about 60% of the domestic market as they are patronised by the middle and the lower income class based on comparison in terms of price and quality (JICA, 2008). Although second-hand

clothing has been identified as providing employment and low cost clothing, there are concerns that the trade may undermine the textiles and clothing sectors and livelihood in Ghana and in developing countries (Baden and Barber, 2005). Ampofo (2000) and Quartey (2006) describe the future of the textile industry as bleak and therefore need pragmatic polices that will lead to both local and global restructuring of the industry. They recommend that the necessary concrete steps should be taken to address the problem of cheap imports, under-declared imports, wrongly described textile imports, and copied brands, markings, tickets and labels including those of the Ghana Standards Board. According to Ampofo (2000) and Quartey (2006), recent proposal by the government to establish an Economic Intelligence Unit to arrest and punish those engaged in trade malpractices is timely. Quartey (2006) states that, trade negotiations and fair trade practices should be made explicit and it should adhered to within the textile and clothing industry. He stipulates that copying brands and other product markings from other countries should be discouraged and it should go together with fair trade practices and preferential access to markets in developed countries.

2.4.1 Human Resource

Human resource is a key factor for industrial development and growth. According to Tyler (2008), clothing manufacturing is an activity dominated by the need of human skills with great range of raw materials, product types, production technologies, production volumes, retail market and brands. The World Bank report on the Ghanaian industries in 1993 indicates that 55% of workers found in the informal sector are trained through apprenticeship, 35% have acquired tenth grade and 10% some tertiary education (World Bank, 1993). Although recent studies (Fianu and Acquah-Harrison, 1999; Fianu and Zentey, 2000) have shown that young designers had high educational background, the majority of workers in the clothing industry acquired skills through apprenticeship. According to Fianu and Acquah-Harrison (1999), seamstresses mainly teach their apprentices free-hand cutting without any theoretical base. Fianu and Zentey (2000) indicate that most of the dressmakers use free hand method of designing styles and clothing construction without paper patterns since they lack pattern-making skills. This method of production does not promote standardisation and mass production.

Monk et al (2008) stipulate that the apprenticeship method of training is common among urban workers in the informal sector in Ghana. Rankin et al (2000) however point out that there seem to be problem for most labour intensive companies in manufacturing sector in Africa and this could be attributed to lack of skills and funds. Liimatanien (2004) concurs with Anon (2004) that informal training through apprenticeship is not efficient as it is characterised by lack of defined structure or curriculum or theoretical aspects, which leads to mainly semi-skilled workers. Sowa et al (1992) study on small industries in Ghana reveal that although a large proportion of the entrepreneurs were educated, most of them lack advanced skills in technical and vocational training relevant to the enterprises. According to Fianu and Zentey (2000), curricula for fashion and clothing need reviewing to strengthen their competence in both the theory and practice. In order for the industry to secure volume of contract, manufacturing jobs or explore foreign niche markets, the industry needs expertise in the areas of production and sales (JICA, 2008). Training facilities have been discussed under Section 2.7.1 in this chapter.

2.4.2 Production Facilities and Methods

The clothing industry universally has been recognised as labour intensive industry with relatively fixed capital thereby allowing easy entry by new entrepreneurs who have the flair for design, a niche in the market, some working capital, but a small amount of fixed capital (Jones, 2006; Cooklin, 2006; Tyler, 2008). Ampofo (2002) describes the clothing industry in Ghana, as typical labour intensive system, which engages in export and import trade. Chimieloweic (1995) describes the system of production used by clothing producers in Ghana as non-industrial. Fianu and Zentey (2000) reveal that the system of production used by the dressmakers remains dominant since the majority (83%) of manufacturers do not use the bundle system. The majority of clothing companies in Ghana do not operate under the division of labour system but one person makes the clothing from the beginning to the end thereby resulting in considerable variations in quality and registering low productivity.

It has been noted that the issue of owner management is the major reason for inefficient operation, insufficient employee training, and or the delay in the adaption of new technology (JICA, 2008). Fianu and Zentey (2000) present

statistics on machinery use by most of the companies and it shows that the companies studied did not use modern machines that facilitate speeding of production. Modern system such as Computer Aided Design (CAD) systems for grading patterns and computer numeric control guided automated cutting systems were not used by the companies. The Ghana Investment Promotion Centre in 1986 reported that the absence of this modern equipment hinders the companies from producing clothing on a large scale. Most potentially significant technological innovation are centred on the preassembly phase of clothing manufacture as such new technologies needed to replace manual cutting techniques for effective clothing production (GIPC, 1996). As part of the ISSP implementation the Ministry of Trade is working closely with the CSIR, other research institutes, educational institutions and technology transfer organisations to increase the overall level of science, technology, research and development, and innovation available to the industrial sector (MOTI, 2011).

2.4.3 Clothing Market

The majority of clothing products in Ghana are sold by open market vendors and on a one on one basis in private enterprises, government organisations, and a few supermarkets and sales agents. Some manufacturers have their own sales outlets in either the same location or somewhere else. A few retailers sell ready-to-wear clothing in large quantities like the industrialised countries. Customers buy from the open markets or custom make their clothing (JICA, 2008). Textiles and clothing products exported from the country are primarily designed for markets in the United State of America, United Kingdom, and other European Union countries holding a combined share of over 80% and 15% to Economic Community of West Africa (ECOWAS). The remaining 5% per cent are exported to other countries mostly southern and East African states which include; South Africa, Zimbabwe, Namibia, Ethiopia (Ampofo, 2000). The largest importer of Ghanaian clothing is the US totalling $1.07 million and accounts for 67% of Ghana's clothing exports, followed by the UK ($70,000), Germany ($60,000), Tanzania (slightly less than $40.000), and Nigeria ($30,000) in 2004, the country exported $1.6 million worth of clothing products. Some of the major clothing items include men's shirt and footwear (GSS, 2004).

2.5 The Structure of the Clothing Industry in Ghana

The clothing industry in Ghana currently comprises several micro, small, medium and a few large scale enterprises. These categories of establishments are in a form of sole proprietorships engaged in the production of made-to-measure and ready-to-wear clothing. The few large-scale enterprises are solely for mass production of standard clothing usually for export. The Ghana Statistical Service (GSS) defines companies with less than 10 employees as small-scale enterprises and with more than 10 employees as medium enterprises (Kayanula and Quartey, 2000). An alternate criterion they used in defining small and medium enterprises is the value of fixed assets in the organisation. The National Board of Small Scale Industries (NBSSI) in Ghana applies both the fixed asset and number of employee's criteria. It defines a small-scale enterprise as one with not more than 9 workers, has plant and machinery (excluding land, buildings and vehicles) not exceeding 1000 Ghana Cedis (US$ 9506, using 1994 exchange rate). The Ghana Enterprise Development Commission (GEDC) on the other hand uses a 1000 Ghana Cedis upper limit definition for plant and machinery, which can pose a problem due to depreciation in the exchange rate. The enterprises in Ghana used an employment cut off point of 30 employees to indicate small-scale enterprises (Steel and Webster, 1990; Osei et al., 1993). Osei et al (1993) however dis-aggregated small-scale enterprises into three categories:

(i) Micro - employing less than 6 people;

(ii) Very small - those employing 6-9 people;

(iii) Small - between 10 and 29 employees.

Many institutions have classified industries into small, medium and large-scale companies. The United Nation Industrial Development Organisation (UNIDO) definition for the developing countries such as Ghana is based on the number of employees as follows;

1. Large - company with 100+ workers
2. Medium - company with 20 - 99 workers
3. Small - company with 5 - 19 workers
4. Micro - company with < 5 workers

The UNIDO classification of industries was adopted by this study. In the survey conducted by the Japan International cooperation Agency (JICA, 2008) the structure of the clothing industry was described under three groups. The first group was described as dressmakers who operate as micro enterprises that use several

sewing machines, make tailor-made clothes and sell them in the open market. This group do not set specific goals or strategy, separate personal and business accounts or fully comprehend their operating status because they do not maintain proper bookkeeping records. The second group consisted of companies that have a few employees, are owners who doubled as designers and managers. Their management including finance and production are separated and handled by different personnel. They produce locally designed clothes and export product to the neighbouring countries, the niche markets in the USA and Europe. The third group operate as large manufacturers and the majority of them make clothes upon demand from foreign buyers and were located in the export processing zone or enjoy tax incentives for export promotion.

2.6 The Role of the Textile Industry

The textile industry mainly produces fabrics for use by the clothing industry and for the export market. The industry produce mainly cotton, which is used in the production of African prints (wax, java, and fancy), and household items such as bed sheets, napkins and school uniforms. Other fabrics produced include synthetic fibres and a blend of the two fibre types, which are used in the production of polyester, acrylic and other synthetics fabrics and their blends (Quartey, 2006). Items produced from these fabrics include uniforms, knitted blouses, socks etc. A number of small companies also produce indigenous fabrics such as tie and dye, batik, woven Kente and hand printed adinkra clothes, which are used for various purposes.

According to Ampofo (2000), the textile industry was the leading industrial sector in Ghana in the 1970's and 80's, which stimulated and contributed significantly to employment and growth in the economy. He states that the textile industry employs about 25,000 labour forces and accounted for 27% of total manufacturing employment. The textile industry has undergone a considerable decline over the years due largely to the liberalisation programmes, which made it almost impossible for Ghana's textile products to compete with the cheap imports, particularly from Asia. About 16 large and medium sized textile companies were established in Ghana in the 1970s but only four major companies survived the instability in the sub-sector investments within the textile industry (Ampofo 2000; Quartey, 2006). The four textile companies in operation; Akosombo Textiles Ltd (ATL), Ghana Textile Printing (GTP), Printex and Ghana Textile Manufacturing

Company (GTMC) produce fabrics for the local market as well as the international market. It is estimated that the few companies that managed to survive operated at just about five per cent installed capacity since 1995. Some of the reasons the authors assigned to the decline of the textile industry include; low demand for local textile products, influx of second hand clothing, lack of competitiveness of local textiles against imported textiles due to high cost of local textiles resulting from high cost of production.

The clothing industry, however, depended directly on the textile sector for various types of fabrics. Cotton locally produced held dominant share, while imported ones from Europe, East Asia, Indonesia, Sri Lanka and Turkey were also used for production (Quartey, 2006). A Diagnostic Report and Export Development strategy for the Textile Industry in Ghana published by Joint Integrated Technical Assistant Programme (JITAP) indicates that imports account for 44% of raw materials used by the industry. Investments within the textile industry are mainly by local companies. The government has identified textile and clothing sector as a potential for accelerating growth in the industrial sector and the economy. This sector which has become one of the main priority areas of the government of Ghana has benefited from programmes such as the African Growth and Opportunity Act (AGOA) and the Presidential Special Initiative (PSI). The Act was enacted by the US government in May 2000 to encourage economic development of African countries by facilitating access to the US market and thereby stimulating their exports to the US (MOTI, 2002). The government of Ghana has recognised the need to significantly increase employment opportunities for its growing population, expand and diversify the economic base, promote both domestic and foreign investment in productive sector as well as stimulate exports.

2.7 The Involvement of Government and Other Private Organisations

Some government and private organisations have been involved in the affairs of the clothing industry in Ghana. These organisations discussed include Textile and Garment Training Centre, Presidential Special Initiatives (PSI) under the Ministry of Trade and Industry, Ghana Standards Board (GSB) and Association of Ghana industries (AGI).

2.7.1 Textile and Garment Training Centre

The Ministry of Trade and Industry in collaboration with United Nation Industrial Development Organisation (UNIDO) has established training centres to help companies acquire the necessary skills needed to improve upon the production of clothing. Ampofo (2000) states that the Spinnet Textile/Garment Cluster was instituted to bring together the operators of micro, small, and medium enterprises in the textile and clothing sector in order to assist in addressing their various concerns. Employees from various clothing companies are trained on mass production strategies, subcontracting, up grading of technical and marketing/managerial skill of members, and financial assistance to the sector. The Industrial Sector Support programme (ISSP) for 2011-2015 implemented by the Ministry of Trade indicates that it will expand opportunities for subcontracting and develop the mechanisms for SMEs. The implementation will help the companies take advantage of the opportunities in the industrial sector of which textile and clothing are included as fostering sub-contractual relationships between large and medium scale manufacturers and small scale firms will be promoted (MOTI, 2011).

The Textile and Garment Trading Centre (TGTC) was also established to train sewing shop workers for mass production, rather than dressmakers with tailoring skills, and with basic management skills such as bookkeeping. This has resulted in an increase in machine operators and technicians (JICA, 2008). The centre's laboratory is equipped with state of the art industrial sewing machines, computer aided design equipment and other modern accessories. The centre's facilities are being used to up-grade skills of textile and clothing industries to take advantage of AGOA to export to the U.S. and other export destinations. The centre also;

a. Undertakes skills training in manufacturing science and technology.
b. Rationalise strategies towards higher value-addition to meet international standard taste and competition.
c. Promote vigorous R&D to enhance modernisation of the manufacturing process at all levels and branches in the industry.
d. Assist small scale operatives with inputs to enable them stay in business.
e. Promote inter-business co-operation for collective learning process Interchange ideas and shared experience and knowledge towards improvement of product quality and access to profitable market.

Twenty one national vocational training institutes have been established under the assistance of UNIDO to provide basic practical and theoretical training in tailoring and dressmaking. According to Quartey (2006), the aim of these institutions is to up-grade skills of textile and clothing industries that take advantage of AGOA and exports in other destinations. Other large-scale companies train operators on-the-job training basis (JICA Report, 2008). Various programmes of clothing and design are being taught in four polytechnics in Ghana (Accra, Kumasi, Ho and Takoradi) in order to produce middle manpower that have theoretical base needed by mass production or ready-to-wear clothing companies. Three government universities also offer courses in fashion design and textiles to produce higher workforce qualifications.

2.7.2 Presidential Special Initiatives (PSI) under the Ministry of Trade

The government of Ghana launched the Presidents Special Initiative (PSI) in 2001 in a bid to expand the economy, create jobs and reduce poverty. It was intended to develop a critical mass of high growth oriented internationally competitive exporting companies in some sectors targeting the American and European consumer markets. This special initiative is aimed at supporting local entrepreneurs in their efforts to develop the local and national markets, with the long term goal of seeking export opportunities. The programme therefore targets SMEs rather than micro-enterprises. The special initiative is expected to benefit from the various favourable market access opportunities (quota and duty free/preferential duty access) available for Ghanaian manufactured clothing and textiles into the European and American markets under the Lome/Cotonou Accor (MOTI, 2005). The Ministry of Trade and Industry implemented the Presidential Special Initiative (PSI), as one of the major local industry development.

It is envisaged that the clothing industry will have better access of clothing to the US market by using African Growth Opportunity Act (AGOA), which focuses on the reinforcements of production capacity and human resources development of mass production in the clothing industry. Ghana offered incentives to encourage several clothing companies to relocate to the country as part of the Presidential Special Initiative. Many of these companies export to the United States under the African Growth and Opportunities Act, which waives duties on selected goods from eligible African countries. It is expected that the clothing sector would create 70,000 jobs

and generate export revenue of $3.4 million in four years. The PSI second production platform, would involve building capacity of about 100 Ghanaian enterprises to establish and operate medium-scale manufacturing plants for clothing. It is expected that about 20 Ghanaian entrepreneurs would become merchant clothing exporters and work with about 50 small-scale tailors/ dressmakers in due course. Presently seven companies and five medium-sized companies are provided with support in the form of facilities, production equipment and manpower training under PSI (JICA, 2008).

2.7.3 Ghana Standards Board (GSB)

Product quality is one of the primary determinants of the competitiveness of manufacturing companies (Dinye and Nyaba, 2001). The Ghana Standard Board is the national statutory body responsible for the management of the nation's quality infrastructure and oversees that products produced locally meet the set standards. It is the regulatory authority, which controls and approves products within its jurisdiction, exercises the legal right to control the use or sale of products and takes enforcement actions to ensure that products marketed within its jurisdiction comply with legal requirements. The Board was established by the Standards Decree, NRCD 173, 1973 with the following aims;

to establish and promulgate standards with the object to ensuring high quality of goods produced in Ghana either for the local or export markets;

to promote standardisation in industry and commerce,

to promote industrial efficiency and development,

to promote standards in public health and industrial welfare, health and safety.

The mission of the Board is to promote standardisation for the improvement of the quality of goods, services and sound management practices in industries and public institutions in Ghana. It has the mandate to provide the following services:

- National standards development and dissemination
- Product testing and analysis
- Inspection activities
- Product certification scheme
- Calibration, verification and inspection of weights, measures and weighing and measuring instruments

- Pattern approval of new weighing and measuring instruments
- Destination inspection of imported high risk goods
- Promoting quality management systems in industry advice the Ministry of Trade, Industry, Private Sector Development and President's Special Initiatives on standards and related issues

Ghana Standards Board develops and promulgates standards for all sectors of the economy. The standards are developed through technical committees and their sub-committees. They comprise of representatives of the relevant stakeholders in a particular subject area or industry sector. These standards are produced by a process of consensus between stakeholders in an open and transparent manner. Standards are used by the government, private sector and consumers in procurement, trade, production, manufacturing and provision of services. The development of a Ghana Standard is initiated by stakeholders composed of regulators and the government sector, industry, consumers and non-governmental organisations, professional bodies and associations, research and technical bodies and educational institutions. There are about 100 Ghana textiles and clothing standards, of which seven deal with size designation and measurement and they are as follows;

GS ISO TR 10652: 1991 Textiles - Standard Sizing – Clothes,

GS ISO 8559: 1989 Textiles - Garment Construction- Body Dimensions,

GS ISO 3635: 1981 Textiles- Size designation measurement procedure,

GS ISO 3636:1977, Textiles - Size designation - Men's and Boy's Garment,

GS ISO 3638 1977 Textiles - Size designation- Infant Garments,

GS ISO 4415: 1981, Textiles - Size designation- men's and boy's underwear, nightwear and shirts,

GS ISO 4416: 1981 Textiles - Size designation- women's and girl's underwear, foundation garment and shirts.

Ghana Standard Board carries out the standardisation of clothing in industry. The Board operates a system under which all manufacturers are required by law to have their products certified (Dinye and Nyaba, 2001). The Board's lack of financial and human resources does not allow for a satisfactory check on the range of manufactures therefore undermining the reliability of certification in terms of international standards. Dinye and Nyaba (2001) indicate that the Board has failed to live up to its mandate of encouraging industry to observe a set of standards as part of promoting standardisation. The Board's failure was attributed

to its attitude towards the promotion of standard because it has little capacity for enforcement.

The Deputy Minister of Trade and Industry in a speech during the Board's 40th anniversary acknowledged the need for the Ghana Standards Board to enforce quality by ensuring that product and service meet specifications for the development (Ghana Standards Board, 2007). The Ministry of Trade and Industry has implemented a National Quality Policy, to upgrade the policy and legal framework and appropriate infrastructure for the application of voluntary standards, technical regulations (mandatory standards), conformity assessment and accreditation. Through this national policy, the Ministry will introduce a shift from a mandatory to a voluntary approach to standards, which will encourage trade and development. A national standards strategy and action plan will be developed, which will provide a common understanding amongst all stakeholders to enhance Ghana's standardisation (ISSP, 2011).

2.7.4 Association of Ghana industries (AGI)

The Association of Ghana industries serves as a core organisation in Ghana's industrial development process, conducts research and studies relating to the possible establishment or repeal of laws and regulation that may affect the industry. The association express support for opposition required by making industry related recommendations and submit opinions to the government (JICA, 2008). The association has advocated for adjustment, support and government assistance. This is commensurate with the help granted to their competitors in other countries, in the highly overvalued exchange rate of the local currency (the cedi) adjusted in order to stimulate a supply response through export expansion and import substitution. However, many companies have been adversely affected by the sharp rise in the price of imported inputs and the cost of financing them. The association launched a special programme called 'Industrial Subcontracting' in developing contractual relations between small, medium and large scale companies with scope for outsourcing of production services from large to small and among small and medium scale companies. The idea was to build and enhance the capacity of small enterprises.

The association indicate that the entrepreneurs do not object to the trade liberalisation policy but among their worries is the dumping in Ghana of subsidised goods from South East Asian countries. According to Dinye and Nyaba (2001), although trade liberalisation made it possible for domestic manufacturing companies to gain access to otherwise scarce material inputs and equipment, it also intensified competition from imported products. Ampofo (2002) state that the tariff structure is being revised to conform to current economic trends, with this, proposals have been made to increase import duty on all imported textiles and used clothing to bridge the gap between locally manufactured textiles and imported textiles and clothing. Among those industries using domestic resources, food and wood products companies have recorded high growth rates. According to Ampofo, (2002), the performance of import dependent companies such as the clothing and textile sub-sector has been somewhat unstable and unimpressive. Problems such as a low capital and equity base as well as inadequate working capital seriously affected their import capacity resulting in low utilisation of both capital and labour. The companies badly affected include textile and clothing subsector. There are, nevertheless, clear cases of positive recovery and growth of some companies in the clothing industry.

2.8 Chapter Summary

In this chapter, the manufacturing strategy of the clothing industry in Ghana has been reviewed. It is evident from literature that the clothing industry play a major role in the economy. It has been identified as an engine of growth for the economy of Ghana and as a source of employment for the population and critical in promoting the economy. The government has implemented programmes such as the Presidential Special Initiative (PSI) and the African Opportunity Growth Act (AGOA) in order to expand the economy, create jobs and reduce poverty. Other facilities such as training centres and schools have been established and some existing ones revamped in conjunction with some non-governmental agencies to equip the clothing industry to meet the standards and demands of the market. Literature established that the system of production used by clothing manufacturers in Ghana were non-industrial as the majority of them did not have access to modern machinery and expertise. It was evident that the majority of clothing companies were micro-small scale predominantly producing customised clothing. The medium scale companies were involved in customised clothing as

well as ready-to-wear clothing and a few large-scale companies mostly involved in mass production focused on export trade more than the local market.

It became evident from literature that although there were about 100 Ghana textiles and clothing standards, the Ghana Standard Board has not been able to promote these standards. The majority of clothing manufacturers do not use any clothing standards thereby resulting in the production of substandard goods. Literature revealed that the inability of the board to implement the clothing standards may be due to lack of financial and human resources. This may have perhaps hindered the Board from creating awareness, implementing and inspecting product range of clothing in the Ghanaian market and also undermining the reliability of certification in terms of international standards. It is evident that the lack of quality and conformity of standards has led to the collapse of most of the large scale, which were in export trade. Literature reviewed showed that the industry faces many challenges, which need the intervention of the government. Some of the challenges identified were lack of marketing outlet, capital, skilled labour, modern and durable machines, and difficulty in acquiring workshops. It was revealed that the decline of the activities of the clothing industry may be due to some government policies. These policies have resulted in the clothing manufacturers facing an intense competition from imports and used or second hand clothes. It was revealed that although the government has implemented programmes to protect and equip the local industry they have had less success in protecting and contribution to the progress of the clothing industry.

CHAPTER 3: Literature Review on Anthropometrics and Body Shape

3.1 Introduction

This chapter reviews literature on anthropometrics and body shape. The topics reviewed include definitions and meaning of anthropometrics, historical perspective of anthropometric surveys and previous women's anthropometric surveys. It discusses the principles and practices of clothing anthropometrics,

procedures and methodologies of clothing anthropometrics, determination of measuring positions and anatomical points, instrumentation and body measurement techniques. It critically examines sizing systems and their importance to the clothing industry. The chapter finally reviews literature on body shape, body image, body cathexis and consumer satisfaction and dissatisfaction of ready-to-wear clothing.

3.2 Definitions and Meanings of Anthropometry

Anthropometry involves the study of human body measurements and has been defined in different ways by various authors. Roebuck (1995) defines anthropometry as a science of measurement and the art of application that establishes the physical geometry, mass properties and strength capabilities of the human body, which encompass a variety of technique for determining limitness number of dimension. According to Oborne (1982), anthropometry is the study of body dimensions representing an essential aspect of any ergonomics investigation. Pheasant and Haslegrave (2006) define anthropometrics as the branch of human sciences that deals with body measurements, particularly with body size, strength, mobility and flexibility and working capacity.

According to Cameron (1984) anthropometry is the systematic study of the physical stature of the human, which reaches back into the eighteenth century. The Oxford English Dictionary (2007) defines anthropometry as the measurement of the human body with the view to determine its average dimensions, and the proportion of its parts, at different ages and in different races or classes. The Sci-Tech Encyclopaedia (2009) defines anthropometry as the systematic quantitative representation of the human body and techniques used to measure the absolute and relative variability in size and shape of the human body. Cooklin (1990) states that anthropometry involves the systematic collection and correlation of the precise measurements of the human body for various purposes such as anthropological research, sizing of clothing and the creation of dynamic environments that provide safety and efficiency.

The collection of anthropometric data needs to be updated since changes occur in the distribution of body dimensions because of changes in lifestyles, diet and ethnic composition of populations (Oborne, 1982; Roebuck, 1995). The authors

point out that the association between clothing sizes and body measurements also changes all the time. Croney (1980) indicates that greater satisfaction can be achieved when manufacturers correlate artistic and industrial efforts in their designs by relating it perfectly with the user. Oborne (1982) concurs with Croney (1980) that an anthropometric dimension of the subject is the most basic consideration for ensuring they are as well suited, as the situation will permit. This implies that clothing manufacturers should be up to date with information on different types of human body sizes and shapes. Oborne (1982) points out that in most studies, anthropometric is unconsciously considered to involve subjective judgements for instance clothing manufacturers can produce better fitting clothing when clothing anthropometric data is used as it deals with the actual physical measurements of a person. Various authors have shown that anthropometry is an important branch of ergonomics, which plays a role in industrial and clothing design (Oborne, 1982; Roebuck, 1995; Pheasant, 1998; Bridger, 2003; Pheasant and Haslegrave, 2006).

3.3 Historical Perspective of Anthropometry

The word anthropometry was coined by George Cuvier (1769-1832), a French naturalist, from the Greek roots man ‘anthro’ and measurement ‘metreen’ meaning the measurement of man (Oborne, 1982; Cooklin, 1991; Roebuck, 1995; Fan, 2000; Bridger, 2003). Other authors (Cameron, 1982; Pheasant 1996) indicate that a German physician, Johann Sigismund Elsholtz in Padua in 1654 invented the word ‘anthropometria’ as his graduation thesis title, which focused on human proportion for the development of human form for medical or scientific purposes. According to Tanner (1981), anthropometry is arts impregnate by the spirit of Pythagorean philosophy, and not science. Tanner reveals that the study of anthropometry came about when there was the need for instruction about the relative proportions of the body parts to help painters and sculptors in their work as they considered the mundane occupation of making life-like images. Pheasant and Haslegrave (2006) state that Leonardo Da Vinci, a renowned painter, through his celebrated drawing of a ‘Vitruvian Man’ demonstrated the theory of human proportion by drawing a man’s body circumscribed within a square and a circle.

According to Pheasant and Haslegrave (2006), the ‘Four Books of Human Proportions’ of Albrecht Durer’s (1471-1528) in which he attempted to categorise and catalogue the diversity of human physical types was also regarded as the

beginnings of modern scientific anthropometry. Cameron (1982) points out that Aldophe Quetelet (1797-1874) indicated in his book that anthropometrics was promoted and popularised by Charles Roberts (1901) and Paul Topinard (1830-1911). Cameron (1982) who traced the origins of the science of anthropometry in a number of different ways as the interest of the study of human growth increased. He also reveals that the three men who first studied longitudinal growth through measurements were Count Phillibert Gueneau de Montbeillard (1720-1785), the Duke of Wurttemberg, Carl Eugen and Adolphe Quetelet. Count Phillibert used a standard measurement technique to study the growth of his son at six-monthly intervals; the Duke of Wurttemberg, Carl Eugen introduced Carlschule in Stuttgart between 1772-1794 where pupils were measured at regular interval and Adolphe Quetelet in 1870 measured his own son and daughter and other two daughters of a friend aged between 5-17 years until maturity. Cameron specifies that Galton in 1874 presented a report on the study undertaken by Fergus and Rodwell in which the height, weight, chest, upper arm and head circumference of 550 schoolboys aged 10-19 years from Marlborough College were taken and studied.

The use of anthropometrics in the social sciences began in the mid-1970s among cliometricians who were interested in measuring living standards in order to understand better hidden effects of economic development on the growth of the human organism (Cameron, 1982). Many studies undertaken in the 80's and early 90's became the strongest influence in the study of human growth such as the Harpenden Longitudinal Growth study which was set up by J.M Tanner and R.H Whitehouse in 1949 (Cameron, 1992).

The development of anthropometry was influenced by the development of physical anthropometry and the search for evidence of 'racial' variations (Pheasant, 1986; Roebuck, 1995). It was primarily used in an attempt to distinguish among race and ethnic groups of humans, to identify criminals and to aid in making medical diagnosis. Three conferences; the congress of the German Anthropological Society held in 1874, the Craniometric conference in Munich (1877), and in the Berlin conference (1880) resulted in the creation of the Frankfurt Agreement which was finally adopted by the anthropometrical society. An international agreement for the unification of anthropometric measurements of living subject was finally drawn in Geneva at an international congress held in 1912 (Cameron, 1982).

Roebuck (1995) indicates that anthropometry has now become useful in industrial settings and is identified in the development of engineering design, requirements and the evaluation of modern vehicles, work sites, equipment, and clothing. According to Aldrich (2007), European tailors were the first to be interested in anatomical body measurements and their relationship to proportion and pattern drafts as naked bodies were used for pattern making in tailoring. Aldrich indicates that the study of anatomy, the mathematics of the body proportion and its application to pattern drafting has contributed to the development of standard sizing. The importance of the new feature of the new work taking place was that clothing sizing was now based on the body measurements and not clothing measurement (Aldrich, 2007).

3.4 Previous Women's Anthropometric Surveys

Clothing manufacturers in the early days developed their own sizing methods for women's ready-to-wear clothing, leading to great variation in sizes and confusion for the consumers (O'Brien and Shelton, 1941; Tamburino, 1992; Ashdown 1998). Various surveys have been conducted across the world to determine size and measurements for specific groups within a population for clothing purposes. Each of these surveys employed anthropometric methods in the taking of body measurements. Cooklin (1990) stipulates that the most common tools used were the tape measures and callipers, anatomical landmarks, which were determined and marked on the body with skin pencil over a specially designed measuring costume. In situations where measurements were taken over the clothed areas of the body, adjustments were made to bring them in line with those taken over nude areas of the body (Cooklin, 1990).

The majority of recent surveys conducted used the body scanning method. Two-dimensional (2D) scanners were invented to improve on the body measurement taking, which was further improved to three dimensional (3D) body scanners (Simmons and Istook, 2003). This advanced technology was employed to save time, money and obtain the maximum results from the body measurements. The 3D image body scanner is the current technology of choice, being used in international surveys. According to Bougourd (2007), the 3D scanners offer significant advantages over the manual body measurements techniques, which were used in the early surveys. Data obtained from this technology is expected to be accurate and should provide automated 3D body analysis information delivered

to the apparel industry in a form which is immediately useful (Istook and Hwang, 2001; Mckinnon and Istook, 2002; Simmons and Istook, 2003; Chi and Kennon, 2006). The authors state that scanners are now used to measure body size, shape and body volume in ways which can be customised for each apparel segment and even allows for the direct creation of clothing patterns from 3D data, avoiding the interpretation step of using measurements and shape. Many countries have conducted anthropometric surveys for the production of ready-to-wear clothing to satisfy their customers. Both large and small surveys conducted have yielded some results. The US survey is the landmark in the history of anthropometric surveys in clothing, which has formed the basis for all sizing system for women's apparel (O'Brien and Shelton, 1941). A summary of some of the earlier surveys are reviewed below.

3.4.1 Surveys Conducted in America

The first large-scale anthropometric survey was conducted in the USA 1939- 1940 sponsored by the US Department of Agriculture (O'Brien and Shelton, 1941; Yu, 2004c; LaBat, 2007). According to the authors, 59 measurements including girth, height and weight were taken from each of the 15,000 women aged above 18 years in eight states using the traditional methods. This survey was to provide accurate measurements for use in the production of women's clothing and patterns in order to create uniformity and clothing fit for consumers in the USA market. According to O'Brien and Shelton (1941), a sizing system based on height and hip girth was first published in 1941 from the data. This standard failed to address problems of clothing fit because the survey did not include other ethnicities and white rural dwellers. United States Department of Commerce in 1958 published Commercial Standard CS 215-58 as a voluntary sizing standard for the apparel industry, which was based on a further analysis of 104 body measurements data (Cooklin, 1990; Tamburino, 1992; Aldrich, 2007). With this system, women were divided into different size categories including Misses, Juniors, and women's figure type categorised as slim, average and full hip types per bust size and offered in 'short', 'regular', and 'tall' sizes based on bust measurements (Cooklin, 1990; Tamburino, 1992; Aldrich, 2007). Another standard, PS 42-70, was instituted in 1970 based on sizing dimension of CS 215-58 and health surveys from 1960-1962 (Workman, 1991; Salusso et al., 2006; LaBat, 2007; Yu, 2004c). The goal of this standard was to reflect the industry

practices of avoiding production of short, medium and tall height variation within the figure types, thereby reducing the 20 size codes in the previous standard (CS 215-58) to 7 in the current standard (PS 42-70) for all figures types.

According to Ashdown (1998), lack of current standards and confusion about size designation led to the formation of a committee, the American Society of Testing and Material (ASTM), which developed new voluntary standards for the industry. Ashdown states that the committee published an updated standard known as D5585-94 consisting of ten body sizes and each with 39 body measurements. This standard was derived from anthropometric data compiled from designers, experience and market observations in the USA. Another survey, which named Size USA was conducted in 2002, used the body scanning technology for the American National Size Survey. Body measurements were extracted from over 10,000 scanned subjects who were grouped into gender, six age groups, and four ethnicities, shopping behaviour and anonymous demographic (Ashdown, 1998; Yu, 2004c).

3.4.2 Surveys Conducted in UK

Yu (2004c) states that the British Standard Institution in 1947 developed standards relating to clothing sizing in a series of product standards such as women's blouses (BS 1345). The British Board of Trade published the results of a survey involving 5000 women in 1957, which included 126 sizes catering for 98% of the adult female population institution (Beazley, 1997, Winks 1997; Yu, 2004c). The smallest range, which could be devised from the analysis of the survey, was 46 sizes, which were estimated to have covered 80% of this population group (Winks, 1997). The recent national sizing survey conducted in Britain, named SizeUK, was launched and undertaken between 1999 and 2001 and the results were published in 2004. It used the TC^2 body scanner, which was termed successful. Bougourd and Treleaven (2000) indicate that the survey was carried out under the collaboration between UK Government, 17 leading British retailers, academics and technology companies. In all 11,000 men and women aged 16-95 years from different ethnicity and socio-economic factors were scanned and 130 measurements extracted using 3D whole body scanner and 10 manually taken (Bougourd and Treleaven, 2000; Yu, 2004c).

3.4.3 Surveys Conducted in Germany

According to Winks (1997), the Hohenstein Research Institute in 1963 published size tables based on measurements taken in 1957/58 and 1960/61 which was the first German body measurements tables representative of the population. The Institute again published tables in 1971 from a survey conducted in 1970 of which 21 measurements were taken from each of the 10,000 women measured. A repeat survey was conducted in 1981/2 and the report published in 1983 was similar to the first report (Yu, 2004c). A sizing system was developed in Germany when they adopted the ISO system on 9402 women providing 57 sizes, catering for 80% of the female population (Cooklin, 1990; Yu, 2004c). The resulting size charts for women's clothing kept the traditional numbering nomenclature, based on height divided in short, regular and tall; and an interval of 4cm (Dob-Verband,1994).

3.4.4 Surveys Conducted in France

In France, the Technical Centre for clothing (CETIH) compiled women's measurements with the exception of foundation clothing based on two anthropometric surveys conducted in 1969 and 1970 (Yu, 2004c). In all 8037 adult females between the ages of 18 and 25 years were measured and 26 measurements were taken from each subject (Cooklin, 1990; Winks, 1997; Yu, 2004c).

3.4.5 Surveys Conducted in Sweden

The Swedish Textile Research Institute (TEFO) in collaboration with the Clothing Institute Federation (KIF) published a sizing system of women based on a national women's anthropometric survey conducted on 1000 subjects involving 40,000 measurements in 1977 (Winks, 1997; Yu, 2004c). In the Swedish sizing system about 95% of the women fall within the height range 152-176cm establishing three height groups-156, 164 and 172cm with interval of 8cm (Yu, 2004c).

3.4.6 Surveys Conducted in Japan

According to Yu (2004c), a survey was conducted in Japan (JIS), which measured 35,000 subjects in 1966/67. A further study was carried out in 1978/81 on 50,000 subjects including female, male, children and infants. The first national survey using

the 3D body scanning technology was however published by the Human Engineering for Quality Life in 1992/94. The aim of the survey was to understand the changes that have occurred in body size and shape in Japan. The survey measured about 19,000 Japanese males and females between the ages of 7 and 90 years, capturing 178 measurement items from 3D scanner and traditional methods. It was revealed that the mean stature of Japanese people has increased by more than 10cm over the last 100 years.

3.4.7 The CAESAR Project

The working group of the CAESAR Project (Civilian American and European Surface Anthropometry Resource) funded by companies was undertaken in 1998-2002 and designed to provide the industry with current measurements for today's body (Yu, 2004c). Representatives from numerous industries including apparel, aerospace, and automotive in America and Europe were also involved (Yu, 2004c). The goal of the CAESAR project was to represent the anthropometric variability of men and women, aged 18-65 in the US and Europe. It used Cyberware whole body scanner technology to scan over 2,400 U.S and Canadians serving as a database for European civilian (Yu, 2004c). In addition to the measurement extracted from the scanner, the project made use of 40 traditional body measurements taken with a tape measure and a calliper. As part of the CAESAR project, Nedscan was formed. The aim was to collect data from over 2000 men and women aged 18-65 years from both the Netherlands and Italy, using a cyberware 3D body scanner to extract 42 measurements from each of the subject.

3.4.8 Survey Conducted in South Africa

According to Winks (1997), a restricted survey was conducted on black miners in South Africa around 1980, which involved 669 male subjects. A national anthropometric survey was initiated by the African Body Dimensions (ABD). The joint venture initiative established a South African national anthropometric database to address the specific requirements in the areas of clothing size and fit. The objective was to establish, maintain and manage a national anthropometric database and to provide a service of interpreting data according to client requirements (Yu, 2004c).

3.4.9 Other Surveys and Studies

The importance of each country having its own sizing system has resulted in a number of surveys around the world. Today, various anthropometric body surveys have taken place in many countries either using traditional or the body scanner methods. These countries include Australia, Canada, China, France, Germany, Hungary, India, Korea, New Zealand and others. Academic researchers have conducted small-scaled surveys. Beazley in 1997-1999 conducted, analysed and developed size charts for the clothing department in Manchester Metropolitan University using hundred (100) students. She explained procedures, correlations and analysis of data that generated body measurement tables, size charts, patterns and basic blocks. Otieno (1998, 2008) conducted a study on Kenyan children and developed size charts for 3-6 year olds and (115) women for developing MMU model of utilising anthropometric data to create size charts. Mlauli (2003) conducted an anthropometric study using black women's data from South Africa. She measured eight hundred and thirteen (813) aged between 20-54 years from nine provinces resulting in the development of body measurement tables. Another study was conducted in Cyprus to develop size charts for Cyprus female aged 20-54 years (Vronti, 2005). Further to this, an academic study has been conducted to develop a size chart for the customisation of the traditional kaba and slit for the Ghanaian women (Kuma-Kpobee, 2009). Six hundred (600) Ghanaian women aged 20-54 years were measured.

3.5 Principles and Practices of Clothing Anthropometrics

Clothing anthropometrics deals with the application of scientific information about human beings to the problems of design by applying the concept of ergonomics (Roebuck, 1995). The concept of fit for example is based on the ergonomic principle of fitting work to people and not people to work (Pheasant 1986; 1987; Oborne, 1995; Koemer and Grandjean, 1997). According to Pheasant (1986), items gain acceptability if it is well designed, structurally sound, functionally appropriate and aesthetically pleasing. Oborne (1995) points out that though ergonomics is becoming understandable there is still an opposing philosophy that man can easily learn to adopt and interact to situations than their products and his environment. He describes this situation as the 'Procrustean approach', a description that is borrowed from Greek mythology, whereby the user of the item is

forced to fit into the item despite mismatch in size. Until recently, the demands of the environments have not been paramount, with the need and abilities of the person in the environment being accorded secondary importance resulting in loss of lives, reduced productivity and errors incurred in many cases Oborne (1995).

Five fundamental fallacies of user centred design that hinder the practice of good ergonomics are outlined by as follows; (Pheasant, 1986; Pheasant and Haslegrave, 2006)

1. When the designer considers the prototype fit him and concludes that it may be okay for everybody creating difficulties for less able members of the population.
2. When a design caters for the average user and concluding that it will be satisfactory for everybody.
3. The assumption that the variability in human beings are so great that all cannot be catered for therefore adjust to any situation and therefore will not complain.
4. The cost and since products are actually purchased on appearance and styling, ergonomic consideration may be ignored.
5. The empathy whereby designer thinks it is a matter of applying common sense ignoring the need for tables and empirical studies.

Bridger (2003) concurs with Pheasant and Haslegrave (2006) that the development of workplace for mass production should involve anthropometric characteristics of the user population, the ways in which these characteristics might impose constraints on the design and the criteria that define an effective match between the product and the user in order to accommodate a wide range of inherent variability. They explain that the criteria for deciding what constitutes a population for design purposes should be functional and relate directly to the problem at hand. Based on this they recommend that fitting trials are needed in order to visualise potential design problems. This allows the designer to carry out trials that can be performed on a representative sample of users, using aids such as mannequins or digital human models using workspace simulation software. Bridger (2003) adds that adjustments are made if needed to suit the user subjects after fitting trial.

3.6 Procedures and Methodologies of Clothing Anthropometrics

Anthropometric surveys have been conducted around the world to create uniformity in the manufacture of women's clothing. According to Ashdown (1998),

the standards procedures, such as samples, methodologies and technology have been established as a result of the findings of these surveys. An anthropometric survey involves a lot of planning. According to Ashdown (1998), choosing samples for the survey needs to be done with careful consideration. She explains that factors such as age, sex, ethnicity and socio-economic factors have been the basis of categorisation sorted for in order to group subjects for effective data collection and analysis. The analysis of anthropometric data involves the use of key dimensions. According to the following authors (Workman, 1991; Ashdown, 1998; Petrova, 2007), anthropometric data are analysed by choosing key or controlled dimensions that describe well the body shape of the individual. A number of researchers have suggested bust, waist, hip girths and height as useful key dimensions (Ashdown, 1998; Beazley, 1998; Gupta and Gandhagar, 2004; Petrova, 2007; Otieno, 2008). According to Beazley (1988) and Petrova (2007), results from these anthropometric studies generally show that horizontal body measurements (girth) correlate well with each other, the vertical measurements (lengths) correlate well with each other, but the vertical and horizontal do not correlate. Anthropometric data can be obtained by using either direct or non-direct contact methods. Roebuck (1995) indicates that anthropometric instruments classify methods, which involve physical contact with the surface of the body or subject's clothing. Non-contact methods use devices such as body scanners for obtaining measurement from subjects (Mckinnon and Istook, 2002; Simmons and Istook, 2003).

3.6.1 Manual Anthropometric Method

Manual methods for obtaining body measurements use basic tools, which are affordable, easy to handle and use. Though the method takes time and involves difficult processes, it is relatively straightforward when taking measurements of the human body (Roebuck, 1995). This method has been used to conduct several national surveys such as in USA, UK, Germany, France and South Africa. It is still being utilised in surveys where scanners cannot obtain the required measurements. Roebuck (1995) points out that the manual anthropometrics provides numerous types of measurements, which can be from those based on feeling resistance of underlying bone to those involving with slight pressures. He further states that the manual method has been well defined to helps anthropologists and ergonomists understand both what the measurement

represent and the method for summarising and analysing the data. Using manual methods call for effective communication between measurer, recorder and subject. Croney (1980) recommends that recording sheets should be prepared prior to the measurement taking, orderly listed and designed in a form suitable for recording in the field. Roebuck (1995) states that provision should be made to prevent the transmission of skin diseases when using manual method. Cameron (1984) and Beazley (1997) suggest the following procedures should be taken when measuring subjects.

1. The subject should be in minimum clothing (inner clothing) if possible in an unclothed state (ISO, 8559:1989)
2. Measurers should also ensure that the subjects familiarise themselves with the equipment.
3. Organise the laboratory to minimise movement and speed up the work.
4. Place the recorder in a suitable position.
5. Measure unless otherwise stated from the right side of the body. Measurers stand to the side to avoid obstruction.
6. Mark the surface landmarks prior to starting measurements by using coloured adhesive indicators.
7. Apply the instruments gently but firmly.
8. Call out the results in whole numbers (If possible measure the subjects twice for all dimensions).
9. Avoid measuring too many subjects in any one session.
10. Appearance should be checked.

The International Standard ISO (8559:1989) states that taking measurement encompasses vertical, horizontal and other measurements. It explains vertical dimensions as those measured using measuring a stand and tape measures held against the body and the horizontal as dimensions that deal with the circumference or girths of the body. Manual measuring may require lots of time and demands care. Yu (2007) and Beazley (1997) concur with Roebuck (1995) that measuring the human body manually demands a lot of effort as it is very difficult and time consuming. They outline procedures such as identification of posture, identification of landmarks, instrument position and orientation and pressure exerted by the measuring instrument as sources of numerous errors in measuring procedures. Yu (2007) agree with Roebuck (1995) that true values obtained in anthropometry may depend on the accuracy and precision that can be

achieved by the researcher and his team through vigorous training and acquainting themselves to the instrument used. Muenier and Yin (2000) point out that the pressure exerted by the fibreglass tape when carried out by experts or trained measurers reduces measurement error.

For data to be analysed well, results should be grouped under various categories such as age, sex, height and girth measurements. Roebuck, (1995) stipulates that proper analysis of data and reporting of results of anthropometric is crucial for the future use. Anthropometric data analysis involves some initial statistics. Roebuck (1995) indicates that anthropometric data are summarised using percentiles, means, and standard deviations to establish whether frequency distributions are skewed or kurtosis, in addition measures of confidence and coefficients correlations are calculated. Various researchers have analysed anthropometric data using statistical procedures generating basic statistical figures for the analysis (Beazley, 1997; Vronti, 2005; Otieno, 2008; Kuma-Kpobee, 2009).

3.6.2 Body Scanning Method

The last decade of the twentieth century has seen considerable developments in the science of anthropometry. The 3D body scanner is a new technology developed and currently capable of extracting an infinite number of anthropometric data types and measurements from the human body as well as accumulating very large quantities of information (Mckinnon and Istook, 2002; Simmons and Istook, 2003). Simmons and Istook (2003) stipulate that the apparel industry has continuously relied on linear measurements data, which can be extracted immediately for use, although 3D-scanning technologies provide data on others such as body shape, angles and relational data points. According to Mckinnon and Istook (2002), this technology has given the apparel industry the ability to adjust patterns to an individual, revolutionising the process to cut, sew, and deliver finished tailored clothing to the consumer. Mckinnon and Istook (2002) specify that image captured can be used any time to extract information acknowledging that the image may be useless without well-developed data software, such as, Shape Analysis, Integrity and Tecmath-Vitrus. When compared with manual methods of measurement, taking of readings by 3D scanner is fast and discreet. Technology has strived towards eliminating the greatest impediments to anthropometric surveys: time and data reproducibility (Mckinnon and Istook, 2002; Simmons and

Istook, 2003; Chi and Kennon, 2006). Simmons and Istook (2003) and Chi and Kennon (2006) acknowledge that though the 3D scanning technology is the fastest and the most accurate technique there is currently lack of consistency in respect of the anthropometric measurements produced by these different measuring scanning technologies. Simmons and Istook (2003) point out that whilst any one type of system or standard posture may produce reliable results, significant variation appears to occur because of the way in which each individual type of scanning system captures specific body measurements.

Simmons and Istook (2003) state that until there is standardisation of process in capturing data of specific measurements among various scanners, the clothing industry will not realise the maximum benefit from its introduction. According to the authors there is incompatibility of measuring techniques between the scanners, how each scanner captures specific body measurements and the terms used. Mckinnon and Istook (2002) and Simmons and Istook (2003) admit that the absence of any publication of standards, or the interpretation of measurements and measurement terms have resulted in lack of accuracy when compared against physical measurements. They specify that the 3D scanning were developed based on the contact method and with this, landmarks are also difficult to achieve. Simmons and Istook (2003) propose that the current standards should either be revised to include 3D body scanning or a new set of standard for body scanning should take into account the terminology of measures and the non-palpation by the measurer or the movement of the subject.

3.6.3 Determination of Measuring Positions and Anatomical Points

Landmarks can be positioned by identifying the anatomical points on the body and marking them with visible substance with reference made to the human skeleton (Kunick, 1984; Roebuck, 1995). Marking devices should use ink that is safe for the skin, washable, or coloured adhesive circles marked with a central cross (Roebuck, 1995; Beazley, 1997). Detailed descriptions of how each landmark is determined and the application of instrument of the study are vital for training measurers and for recording purposes. Yu (2004b) indicates that landmarks are located by anatomical points and grouped according to their positions on the body as it provides a predetermined order to permit greater speed in body measuring. Landmarks are used to identify the key points, which ease the errors in collection of anthropometric data in order to have an agreement as to the body

measurements recorded in an anthropometric-based study (Yu, 2004c). Simmons and Istook (2003) point out that the key elements in observer error in the collection of anthropometric data will be the correct identification of body landmarks, as uniformity must be achieved. The following landmark positions have been identified and described by Kunick (1984) and Beazley (1997)

- 7th cervical is most prominent spinous process at the cervical vertebra when the subject's head is in the erect position and located when the head is lowered. With the harness at the zero, position the tape is allowed to fall naturally against the top of the cervical. This is then marked by a cross of the adhesive circle. This position which is referred to as nape, is the most important position and all measurements can be related back to this position.
- The long shoulder can be located at the end of the acromiase by palpation and then position a circle on both the left and right shoulders of the subject.
- The short shoulder is also located at the end of the acromio-clavicular joint and positions a circle on both the left and the right sides.
- The neck joint is positioned at the base of the neck at the higher point of the shoulder in line with the long shoulder landmark. The length from the neck to the right neck point is measured which reveals the position where the point should be located on the left side.
- The centre front neck is determined by positioning a landmark in the hollow made by the supra sternal natch bones at the base of the neck.
- Neckline is identified by positioned 2cm above the four neck base landmarks at the Adam's apple level.
- The waist level is determined by locating the natural waist. Landmarks are positioned and an elastic tape is placed around the waist level making it not too tight to affect the reading.
- The hip level is to determine by locating the widest level. Landmarks are positioned at the centre back and front, right and left side. These must be measured equally from the ground by a metal metre ruler.
- The upper hip girth which is determined as the mid- point is measured between the centre back waist level and the hip level. Landmarks are positioned equally at this level from the hip level at the centre back, centre front, right and left side seams.

- The elbow is located when the subject bends the right arm to touch the shoulder so that the end of the elbow at the olecranon process can be marked and a landmark is positioned.
- The wrist, which is the distal end of the ulna bone, is located on the right arm of the subject and marked.
- The knee level is located when the subject bends her right knee slightly to define the crease line of the tibial knee joint space.
- The ankle level is the lower edge of the tibial bone located on the right ankle of the subject and marked.

3.6.4 Instrumentation and Body Measurement Techniques

Researchers have used various types of instruments in conducting clothing anthropometric surveys throughout the years. The traditional approach has employed the use of simple, quick non-invasive tools like tape measure, weight scale, camera, measuring tape, anthropometer, spreading calliper, sliding compass and head spanner (O'Brien and Shelton, 1941; Simmon and Istook, 2003). Physical anthropologists developed methods of using anthropometers for taking linear dimension from height to foot length and callipers to measure the thickness of the skinfold for the traditional approach Roebuck (1995). Cameron (1984) specifies that tape measure suitability depends on fulfilling five criteria: flat cross-section, have millimetre graduations, have a blank leader strip, made of metal or fibreglass construction and of minimum length of one metre. The weight of subject is assessed by using weighing scale with accuracy of 0.1 kg. Beazley (1997) measured body areas with a variety of tools; meter rule for the hip level, plastic adjustable three sided sliding angle square for the width and rise of the neck, adjustable elastic tapes for the girth measurements and specially made harness with two tape measures fastened at right angles at the zero measurement. Beazley (1997) recommends elastic tape should be used for the girth measuring positions such as the chest, bust, under bust, hip, mid hip and upper arm level. Beazley used a chainnette of fine metallic type for measuring the neck base and a hair clip for tying long hair. Kemsley (1957) recommends the use of a mirror to enable the one measuring to have an all-round view of the subject. Kunick (1994) indicates that subject should be in any suitable undergarment that will not affect the body shape or interfere with the taking of accurate measurements. For bust related dimensions, it has been suggested that

measurement should be taken over an unpadded brassiere that fits exactly (ISO, 8559:1989).

According to Cameron (1984) the Harpenden Longitudinal Growth study, which was set by the two scholars, J.M Tanner and R.H Whitehouse in 1947 became the strongest influence in British studies of human growth and rate among the best in the world. The researchers have been accepted internationally for their accuracy, consistency, ease of use and eliminating graduated rules for measuring linear distances and replacing with counter mechanism. Cameron (1984) further states that automating anthropometric instruments have been a subject of discussion among anthropometrists and this was first suggested by Garn (1962) who linked two-dimensional measurement devices to electronic analysers and recorders and published an account five years later. According to Roebuck (1995), various forms of photography and video single frame imaging have also been used in modern indirect methods using special cameras. Roebuck further states that laser and video devices were the basis of some of the most promising indirect, high-technology measurement system for modern anthropometry.

The use of non-contact approach has witnessed the use of more sophisticated instruments and high technological approaches (Cameron, 1984; Roebuck, 1995). 3D non-contact body scanners are the most recent technology used in anthropometric surveys. Simmons and Istook (2003) specify that the scanners were developed to achieve customer satisfaction, solve clothing variation problems and accuracy of existing size charts. They point out that this system allows for the extraction of body measurements in seconds, giving consistent measurements thereby encouraging the move toward the production of products customised fit.

3.7 Sizing System and its Importance to the Clothing Industry

Sizing system is a process used to establish a size chart consisting of key body measurements for a range of apparel (Schofield and LaBat, 2005). Size charts are presented in a form of tables, which present the value of each of the body dimensions used to classify the bodies encountered in the population for each size group in the system (Yu, 2004c). Each chart is created to serve one body type category of the population. According to these authors (Kunick, 1984; Workman, 1991; Ashdown, 1998; Gupta and Gangdhar, 2004), a sizing system must be a

three dimensional structure by using the bust, waist, hip girths and stature as the main key measurements. Studies have shown that although sizing systems developed by different countries vary in the body dimensions chosen to divide the population, the basic structure of most sizing systems is very similar (McCulloch et al 1998; Ashdown, 1998, 2007; Petrova, 2007).

Ashdown (1998) concurs with Tamburino (1992) that creating many different sets of dimensions having the same size designation were developed as results of the introduction of ready-to-wear clothing. Salusso et al (2006) states that the U.S. sizing system published in 1958 was the first available sizing system and became the template for other countries over time and continues to be the basis of sizing development. Ashdown (1998) points out sizing system was created to find the optimum number of size groups, which describes many shapes and sizes divided into varied population and subsequently into homogenous subgroups. These authors (Schofield and LaBat, 2005; Yu, 2004; Winks, 1997) point out that size charts are designed to accommodate as many individuals in each shape and size groups with well fitted garment in order to satisfy the consumer needs for apparel that fits. Beazley (1997) explains that when developing a sizing system, the body measurements of the population should be divided artificially into groups, the measurements to be contained in each size and labelling should be selected so that the potential customer can recognise a size, which gives a reasonable fit. She specifies that the scope of the sizing, the number of sizes in the system, the scale of the size intervals and other factors that are interrelated need to be addressed. Schofield and LaBat (2005) suggest three steps in creating a sizing system; division of the population into categories, choosing interval and choosing the interval for remaining body measurement for each chart. Ashdown (1998) indicates that sizing system used in design and distribution of ready-to-wear clothing has been based on a selection of key dimensions from anthropometric study. This implies that members in a group should have similarities in the body size so that single clothing can adequately fit them.

Several studies (Kunick, 1984; Tamburino, 1992b; Ashdown, 1998; Gupta and Gangadhar, 2004; Petrova, 2007) outline that size charts have often been created based on trial and error, relying on feedback from small consumer surveys, analysis of sales and returned merchandise reports to more elaborate statistical methods ranging from simple percentiles to complex combinations of multivariate

and regression analyses. Tamburino (1992b) stipulates that the sizing of ready-to-wear clothing has evolved in a fragmented and competitive environment with little adherence to proposed systems for standardising dimensions. She further states that standardising the dimensions of women's apparel sizes has failed because past standards assigned fixed dimensions to each size limiting the freedom the individual producer may have to interpret dimensions for a specific population. Petrova (2007) concurs with Faust et al (2006) that manufacturers have therefore developed their own size charts based on the already existing knowledge and their own assessment of the body dimensions and what they want resulting in varying size charts.

Alexander et al (2005) and Faust and Carrier (2010) are of the view that clothing companies are protecting their interest by not following standard sizing system when designing women's wear because they have target populations of women whose lifestyles, incomes and body shapes differ. Beazley (1997) and Kunick (1984) are of the view that problems associated with sizing cannot be only addressed by statistics but factors such as the influence of art and craft, fashion and the specialised knowledge of the individuals. Tamburino (1992b) enumerates factors that result in variation in size charts as the different price points, which appeals to different incomes, lifestyles and different body shapes, the psychological need of people to feel slim and the physical exercise, diet changes and migrations. She also agrees with Ashdown (1998) the problems associated with sizing systems include the outdated anthropometry data and information not applicable to contemporary needs, lack of standardized size labelling, body measurement on hangtags and sizes appropriate for full range of variation in body types that exist in the population. For this reason, Brunn (1983) specifies that body measurement charts needed to be revised at least every ten years.

3.7.1 Development of Size Charts

The development of a size chart involves the use of current anthropometric data generated by using traditional or body scanning methods. Bougourd et al. (2000) indicate that the manual methods could be slow, expensive, complicated and subject to variations and the 3D body scanner and 2D data capture systems promise greater speed, accuracy and reproductively, but very costly to use. Tamburino (1992) states that data should reflect the dimensional distribution of the

population by geographic area and specific information should be collected following uniform and standard criteria in order to satisfy the technical requirements and clothing manufacturers. According to Otieno (2008), development of size chart should be selected and procedures developed based on precedent guidelines on the body measurements. The following researchers (Beazley 1999; Otieno, 1996, 2008; Gupta and Gangadhar, 2004) have developed size charts by using these procedures; collating of raw data, cleaning by evaluating outliers, identifying missing or spurious values of each variable using a statistical method and selecting descriptive statistics including frequency tables, percentiles, standard deviations, mean, minimum, maximum, for initial evaluation of data generated. Various statistical methods which include percentile analysis, simple univariate analysis, bivariate and correlation analysis have been explored by researchers (Gupta al et, 2006; Beazley, 1997; Salusso-Denior, 1985; Gupta and Gangadhar, 2004). According to Otieno (2008), percentiles have implications for the size base and should be selected carefully; a large percentile produces a bigger base size while a smaller percentile would present a smaller base size. She further states that the 50th percentile identified by using means serves as base size for clothing purposes. Otieno (2008) indicates that percentiles can be used when the anthropometrist wants to vary the sizing groups and those that meet the target market for manufacturers and retailers.

According to Ashdown (1998), the structure of a sizing system is based on selection of dimension from anthropometric study of the population for which the sizing system is designed. There is the need to make important decisions when developing a sizing system. Petrova (2007) states that the selection of the control dimensions in relation to the type of clothing, the size range, inter-size interval or size step, how many clothing must be formed, the secondary dimensions and finally how the clothing must be labelled must be considered. Beazley and Bond (2003) suggest five stages of developing size chart; obtaining raw data; analysis; adding ease allowances; formulating size charts; and conducting fitting trials. Otieno (2008) utilises six steps when conducting her study; planning and preparation; identifying measurements and procedures; data collection; analysis and development of size charts, fitting trials and confirmation of charts.

3.7.2 Determination of Key Dimensions

According to Robinette (1986), key dimensions have a strong relationship with most other body dimensions important to the clothing Chun-Yoon and Jasper (1996) specify that researchers select key dimensions either horizontal or vertical measurements; analysing with statistical method which may vary according to the purpose of the study and the definition of the key dimension. Otieno (1998) point out that manufacturers and consumers use key dimensions, size widths and designation in recognising and selecting size. Beazley (1997) agree with Chun-Yoon & Jasper (1996) that key dimensions should have strong multiple correlations with other dimensions related in clothing and good predictor size, which relates well with other body dimensions. Beazley (1997) further states that primary, secondary or tertiary control measurements should be selected. Gupta and Gangadhar (2004) add that relationships between variables can be determined by using correlation coefficients. Correlation values could be assessed based on the strength of the relationship; a value below 0.5 indicates no relationship, 0.6-0.75 indicates mild relationship and 0.76 and above indicates strong relationships (British Standards Institution, 1990). Key dimension are therefore selected based on the strength of the relationship and the number of correlations with most other variables (Otieno, 2008). Gupta and Gangadhar, 2004) state that, bust, waist, hip and height are four key dimensions having good correlations with other body dimensions and are very critical in determining clothing measurements and sizing systems. They stipulate that the key dimensions are important landmarks on the body and hence should relate closely to the clothing measurements.

3.7.3 Size Range and Codes

Size ranges are determined by differentiating the boundaries between sizes (Beazley, 1998; Otieno, 2008). According to Beazley (1998), size range, dimensions and intervals are for marketing purposes and consideration should be given to industry practice during selection. Size intervals may vary from country to country or from size range to the other, but it is widely accepted that the three major girths; bust, waist and hips all change by the same amount (Cooklin, 1992).

Problems associated with Size Codes and Labels

Tamburino (1992a) state that the concept of ready-to-wear was to provide similar clothing in large qualities to meet the growing needs of the society. Carr Pomeroy

(1992) concurs with Tamburino (1992a) that ready-to-wear process cannot produce clothing to fit the every body shape perfectly, although the intent of size designation has been to fit majority of the bodies falling within the predetermined standard dimensions under varying size systems. They acknowledge that each manufacturer selects the part of the national size scale for their market. According to Tamburino (1992a), manufacturers have used a variety of size codes to designate sizing of ready-to-wear clothing and these codes have tended to be a source of confusion for many customers. Faust et al (2006) indicate that, in the USA, size codes usually suggest sizes for “Junior”, “Junior Petite”, “Misses Petite”, “Misses”, “Women”, “Misses Tall”, and “Half-Size” has been a source of confusion for the consumer. Tamburino (1992a) state that junior sizes are odd numbers coded from 3 to13; misses are even numbers coded from 4 to 20 and half size designated in half numbers from 12½, to 26½ with an interval of 2 for each category. The Canadian General Standards Board sizing system suggests the following codes: 5, 7, 9, 11, 13, 15, 17, 19 for junior sizes which is based on 6, 8, 10, 12, 14, 16, 18, 20 for misses sizes; 10½, 12½, 14½, 16½, 18½, 20½, 22½, 24½, 26½, 28½ for women’s sizes; and 30, 32, 34, 36, 38, 40, 42, 44, 46, 48 based on the European system (Faust et al., 2006). In the UK and Ireland, women’s clothing are coded: 8 to 28 an interval of 5cm; in France, Spain, and Portugal they are coded: 36 to 52 an interval of 2; in Italy they are coded: 40 to 54 an interval of 2 inches and in Germany, Netherlands, Belgium, Norway, Sweden, Finland, Denmark, Luxembourg, and Greece are appear as sizes: 34 to 50 an interval of 2 inches (Faust et al., 2006). The authors express that if one wants to make some comparisons of sizes by different countries then a size 8 in UK will be a size 36 in France, 40 in Italy and 36 in Germany which can easily confuse a consumer who may not know how to compare these sizes from various source unless fitting is done. A size label is designated to provide information allowing consumers to select the correct size efficiently but they become confused and frustrated if size designation does not have a true representation (Chun-Yoon and Jasper, 1996; Otieno et al., 2005). They suggest that a sizing system that accurately describes the body measurements used to design women’s clothing is needed. Faust et al (2006) stipulate that standard size label generally provide no information about body measurements, such as bust, waist, hip and the body shape on which the size is based on. Anderson-Connell et al (2002) indicate that female consumers are left with great variations in size identification as standard size label may reflect many possible sizes rather than one uniform size. Another

source of variation generate from each manufacturer independently deciding on the measurement specifications and size designations for its prototype body (Workman and Lentz, 2000).

3.7.4 Ease Allowance

According to Chen et al (2008), the ease allowance of clothing is the difference in space between the clothing and the body taken into account the pattern by increasing the area along body's outline. Chen et al (2008) acknowledge that the parameters of a pattern should include body size and the amount of ease allowances of the clothing. Gupta and Gangadhar (2004) concur with Beazley (1998) that the addition of ease allowances for variable is important when developing size charts. Beazley (1998) indicates that clothing have to be larger than the body to allow for movement, expansion and style and this requires an extra tolerance known as ease allowance to be added. According to Beazley (1998) the fit and size of the clothing is influenced by dimensional clearance allowed between the body and clothing. The dimensional stability of the fabric is an important factor, which determines that amount of ease allowance. Aplin (1984) specifies that consideration should be given to the bulk of clothing underneath as this may require an extra measurement to cover the layer beneath. Ease allowance are used for different purposes. Beazley (1998) explains that the ease allowance consist of two categories; the wearer ease and design ease allowances. Chen et al (2008) state three types of ease allowances as standard ease, dynamic ease and fabric ease. They explain that the standard ease allowance is the difference between the maximal and minimal perimeters of a wearer's body; the dynamic is the provision of sufficient for subjects who have non-standard body shapes and finally fabric ease allowance taking into account the influence of mechanical properties of fabrics of the clothing.

3.8 Body Shape

Prevo (2005) concurs with Garner (1997) that changes have occurred in women's body resulting in the average size for women increasing and consequently changing their body shape. Chen and Swalm (1998) and Tamburino (1992b) indicate that the changes are due to factors such as, lifestyles, social and culture values combined with heterogeneous with ethnic mix thereby affecting how individuals interpret and perceive body shape. Petrova (2008) indicates that body shape has

become an important issue and analysing it is a logical theoretical underpinning for the development of clothing sizing that will fit well. Petrova (2008) specifies that the same clothing will fit differently on two people with identical key measurements if their bodies are shaped differently. She stresses that the differences in the body shapes may determine how clothing will hang on the figure, how comfortable that clothing feels, and ultimately how that clothing is perceived to fit by the consumer. Previous research has indicated that African American women generally prefer larger ideal body sizes, are more tolerant of a variety of body sizes, and feel attractive at higher weights than Caucasian women (Celio et al., 2004). Borland and Akram (2007) reveal that western women embark on excessive dieting and exercising, grooming and which may result in more dangerous bio-psychological disorders. Simmons et al (2004) state that the shapes and proportions of the current generation differ from the generation before as the hourglass shape is no longer the norm instead; consumers reflect a variety of body shapes and sizes.

According to Vuruskan and Bulgun (2011), body shape studies are carried out in conjunction with knowledge of sizing issues, in an attempt to develop a sizing standard. They state that the current female body shape classifications such as hourglass, triangle, inverted triangle, rectangle, oval and circle are considered in various categories in pattern making and sizing terminologies. Simmons et al (2004) developed software Female Figure Identification Technique (FFIT) for clothing as a starting point for the representation of female figure shapes in a mathematical way. The methods they used involved the development of preliminary subgroups for the female population, which was to aid in better fit of clothing. According to Simmons et al (2004), grouping of terminology for figure types is categorised by shapes, name, letter, and fruit/vegetable. Body shape identification has been a key issue to develop sizing standards for ready-to-wear concept (Vuruskan and Bulgun, 2011). According to the authors, national and international size surveys are aiming to collect anthropometric data with the current measurements on the sizes as well as the body shapes of today's consumers. Faust et al (2006) identified six body types as designed triangle, rectangular, hourglass, diamond, inverted triangle and rounded.

3.9 Body Image

Borland and Akram (2007) concur with Grogan (1999) and Halliwell and Dittmar (2003) that body image is a multifaceted construct that consists of perceptual,

affective and cognitive components. Fallon (1990) states that one's body image includes perceptions of the cultural standards, the extent to which she meets the standard, and the perception of the relative importance that members of society place on that match. A perceived body image may not accurately reflect a person's actual body size and therefore may not be consistent with others' perceptions of her body. According to Jourard and Secord (1955), a negative or positive body image can affect a woman's general self-concept.

Kiney (2009) concurs with Robinson (2003) that the media has been the main source of influence on the perception women have towards their bodies. Dawson et al (2010) and with Gordon (2008) are of the view that the mainstream media has long promoted images of women as young, thin, tall, and white as the ideal figure. This standard according to Dawson-Andoh et al (2010) may be difficult for the average woman in the United States and may be especially impossible for African American women to achieve. Robinson (2003) indicates that the individuals attempts to alter their appearance to resemble cultural aesthetics ideals is believed to be a result of social identity as the culture becomes the aesthetic standard for the individuals to create their appearances.

3.10 Body Cathexis

Body cathexis relates to how closely an individual's current body size matches an ideal body size. According to LaBat and DeLong (1990), body cathexis is an evaluation of dimension of body image as it reflects the positive and negative feelings towards one's body. Rosen and Ross (1968) and Kaiser (1997) describe body cathexis as an integral part of body image and self-concept. The apparel industry uses an idealised image to develop and present its products, and this perception leaves women in a state where their bodies have to meet the standards of fashionable clothing (LaBat and DeLong, 1990). According to the authors, women show dissatisfaction by blaming themselves when they do not see themselves fitting that particular standard.

Some researchers have developed scales, which can be used to evaluate body cathexis and examine attitudes toward the body. Jourard and Secord (1955) pioneered the study of body cathexis by developing the first ever body cathexis scale. The scale consisted of 46 characteristics, which was used to measure satisfaction and dissatisfaction on the seven-point Likert scale. This scale is still

widely used to measure the degree of satisfaction towards the various part of the body and to evaluate the feelings of an individual towards the body. Their study established that there is a connection between the feeling about the body and self-image. Rosen and Ross (1968) developed a 9-body cathexis scale to measure body cathexis at various body features. Cash (1993) developed the Body Areas Satisfaction Scale based on the body cathexis scale, which could be used to assess satisfaction with body, and the areas of greatest dissatisfaction include the hips. According to Cash (1993), women tend to express concern when parts of their body deviate from the ideal body type.

Jung (2001) concurs with Jourard and Secord (1955) that satisfaction with selected body parts varies with the amount of deviation between an individual's actual size and what is considered ideal. Pisut and Connell (2006) study on preference of consumers indicate that clothing fit plays a part in consumer's attitude and self-concept and will reflect those feelings, especially if fit is a consistent problem in shopping experiences. LaBat and DeLong (1990) in their study on retail satisfaction measured responses in three scales; satisfaction with fit of apparel at upper, lower, and total body, satisfaction with fit at specific sites; and body cathexis scale developed by Rosen and Ross to measure body cathexis at various body features. LaBat and DeLong (1990) found correlations between body cathexis and the stated body areas: bust, hip, thigh, buttocks, abdomen, arm, back and shoulder. The authors conclude that the higher the level of body cathexis, the more satisfied female consumers were with the physical fit of ready-to-wear clothing. One factor that may contribute to the dissatisfaction with their bodies is that fashionable clothing reflects a standard sizing, which is not realistic (LaBat and DeLong, 1990). Garner (1997) indicates that most of the women were dissatisfied with their overall appearance especially the abdomen, body weight, hips and muscle tone. Freedman et al. (2004) concur with Parker et al. (1995) that African American women tend to describe female attractiveness in terms of shapeliness while their male counterpart prefer more curvaceous figures with low waist-to-hip ratios.

3.10.1 Satisfaction and Dissatisfaction of Ready-to-Wear Clothing

The apparel industry's sizing systems and the size of clothing themselves have been acknowledged to provide symbols of expectation for women (LaBat and

Delong, 1990). The authors relate the satisfaction with the fit of clothing to an individual's body cathexis. According to Alexander et al (2005), consumers perceive clothing today as more than a basic necessity. Williams (1974) points out that the reason for wearing clothes are numerous, complex and interrelated as it can be used in identifying one with social class, project a positive image and as a means to improve their overall appearance (Alexander et al 2005). They state that consumers differ in attitudes, values and expectations of clothing. They reveal that consumer satisfaction and dissatisfaction with fit of ready-to-wear could go beyond this physical dimension of clothing to include reactions to implicit societal messages. LaBat and DeLong (1990) point out that some clothing may not conform to the body shape resulting in dissatisfaction as evidence in popularity of the weight loss, body building programmes and the acceptance of cosmetic surgery as a means of modifying the body to achieve an ideal figure. Commenting on clothing behaviour of customers, Shim et al (1991) express that individuals who were more satisfied with their bodies and had favourable attitude towards clothing were more likely to be satisfied with ready-to-wear clothing, enjoy shopping, be confident in choosing well fitted clothes for themselves and be heavy purchasers of clothing.

Dissatisfaction with fit is one of the most frequently stated problems with the clothing purchases. Alexander et al (2005) stipulate that body measurements used for the production of clothing should be well interpreted by each manufacturer as fit preference is very subjective and varies from one person to the other. LaBat and DeLong (1990) demonstrate that dissatisfaction with the lower body can be related to decreased satisfaction with the clothing fit in the lower body. The correlation of the lower body satisfaction and the lower body cathexis supports the relationship between the subject's satisfaction with fit and feelings toward personal body. They state that when clothing does not fit, the consumer may perceive the cause as related to the body and not the clothing. They are of the view that although ready-to-wear clothing are made for consumers with proportional bodies it does not answer the need of the majority since their individual bodies may deviate from the standard sizes.

Alexander et al (2005) results show that there were significant associations between body cathexis and body shape. They reveal that correlation of the body types and satisfaction with the body area was statistically significant, confirming

that the degree of satisfaction with different body area depended on the body type of the individual. LaBat and DeLong (1990) state that clothing dissatisfaction is a result of trying to fit real bodies into clothing that the clothing industry sized according to an ideal body shape with slim hips in proportion to upper body measurements. They indicate that the departure from the stereotypical definitions of female body types could result in new sizing system that would fit more customers. LaBat and DeLong (1990) and Alexander et al (2005) are of the view that women with a decreased body cathexis have a higher dissatisfaction with the fit of ready-to-wear, especially the lower part of the body.

3.11 Chapter Summary

In this chapter, literature on anthropometrics was critically reviewed. It examined the definition, historical perspective of anthropometric surveys and its importance to the clothing industry. Although various authors have defined anthropometrics differently, they related the term to the measurement of human body. Many researchers have conducted anthropometric surveys towards the development of sizing systems for the production of clothing. Most of the early surveys laid down the procedures and identified the necessary equipment for conducting anthropometric surveys. Although the origin of anthropometry differ from one author to the other, its use in the clothing industry have helped in the development of sizing systems for different populations.

It was evident from the literature that the main objective of creating a sizing system is to find the optimum number of size groups, which describes many shapes and sizes divided into varied population and subsequently into homogenous subgroups. Various countries vary in the body dimensions chosen to divide the population, therefore the body dimensions to be contained in each size and labelling of these sizes should be selected so that the potential customer can recognise a size, which gives a reasonable fit. Detailed analysis of data using clear procedures of size development is vital since the selection aspects such as key dimensions, size intervals and ease allowances determine the fit of clothing. It became evident that literature on anthropometric survey conducted using the Ghanaian population for developing a sizing system for the production of ready-to-wear clothing was non-existent.

Literature showed that the methods and equipment use for survey have advanced from the manual method of taking measurement to 2D scanners and finally the 3D body scanning technology. Although the scanning technology is considered more reliable, faster and accurate, it is very expensive and has some limitations. These limitations have been identified as incompatibility of measuring techniques between the scanners, lack of accuracy when compared against physical measurements, absence of any publication of standards, terms for the interpretation of measurements and difficulty in achieving landmarks. Although the manual method is time consuming, needs accuracy and precision, it is still use around the world in situations where the scanners are not available and measurements, which cannot be captured by the scanners.

This chapter also reviewed literature on body shape, body image and body cathexis and clothing satisfaction. It is evident that factors such as lifestyle, diet and socio-culture values of women have resulted in an increase in the average size thereby changing the body shape currently. Body shape has become an important issue and analysing it is a logical theoretical support for the development of clothing sizing that will fit well (Petrova, 2008). It was evident that the media has long promoted images as young, thin, tall and white women as the ideal figure thereby affecting the body image of women who do not fall into that category. It became clear that significant relationship existed between body cathexis and body shape as they determined the behaviour of customers towards the selection of clothing type. It was revealed that women differ in attitudes, values and expectations of clothing but the underpinning factor is that the more women are satisfied with their body the more satisfied they are with the physical fit of ready-to-wear clothing.

Chapter 4: Research Methodologies - Interviews, Questionnaires and Focus Group Discussions

4.1Introduction

The methodological strategies adopted for this study are divided into two chapters (4 and 5). This chapter focuses on the methodologies for conducting interviews, focus group discussions and questionnaires appropriate for addressing Aims 1 and 2 for this study. This chapter consist of three phases. The first phase discusses interviews conducted for the clothing manufacturers and stakeholders. The second phase discusses the focus group discussions for consumers and the third phase focuses on the methods used for the questionnaire survey for consumers. Chapter 5 focuses on the methodology used for the anthropometric survey.

4.2 Research Design

Research design involves the approach to philosophical assumptions as well as distinct strategies of inquiry or procedures and specific methods (Creswell, 2009). Consideration of an appropriate research design assisted the researcher in the process of data collection, analysis and discussion of the findings. For the purpose of this study, grounded theory was used as it is a widely used framework for analysing qualitative data (Bryman, 2008). Grounded theory starts without a theoretical base for a pure theory building purpose (Saunders et al., 2007). Strauss and Corbin (1990) explain that grounded theory approach discovers,

develops, and provisionally verifies through systematic data collection and analysis of data pertaining to that phenomenon. Miller and Crabtree (1999a) state that the goal of grounded theory is to develop classifications and theory grounded in the particular social scene investigated. With grounded theory data collection, analysis, and eventual theory stand in close relationship to one another (Strauss and Corbin, 1998).

Quantitative and qualitative approaches, which included three data collection strategies: interviews, focus group discussions and questionnaire were used for the study. The initial literature search resulted in identifying the main theoretical concepts of this study and the use of these methods. According to Neuman (2000), reviewing accumulated knowledge about a subject is an essential early step in the research process. The interviews were used in obtaining first hand and in-depth information on current sizing systems used in the production of ready-to-wear clothing from clothing manufacturers and stakeholders thereby addressing Aim 1 of this study. A mixed method, which combines different research approaches and strategies was used for the second and third phases. Focus group discussions and questionnaires were employed to obtain information concerning consumers views on body shape and size, body cathexis and their effect on clothing choice (Aim 2). The mixed method approach is based on the expansion justification to extend the research variables in different contexts and viewpoints (Bryman 1988). Mixed method design was applied in the current research to enhance the validity and generalizability of the findings and triangulation corroboration between the quantitative and qualitative data. According to Bryman (1988), the confidence in the research results can be achieved through mixed method and using different resource to study variables.

A qualitative approach to data collection, analysis and discussion was used for the interviews and focus group discussion. Qualitative approach allows the researcher to go beyond pure description by paying particular attention to details of the study and providing analyses of the environment examined (Bryman, 1988). According to Creswell (2009), qualitative research explores the meaning individuals or groups ascribed to a social or human problem. Qualitative methods helped the researcher to build patterns, categories, and themes by organising the data into increasingly more abstract units of information until a comprehensive set of

themes were established. The quantitative method on the other hand provides description of trends, attitudes or opinions of a population by studying a sample of that population (Sarantakos, 2005). This approach uses a special language which appears to exhibit some similarity to the ways in which scientist talk about how they investigate (Sarantakos, 2005). Quantitative approach was used in this study to examine the relationship among variables where they could be measured on instruments, so that numbered data could be analysed using statistical procedures.

4.3 Interviews

Semi-structured interview method was considered appropriate as it yields the right data and complies fully with the standard and principles of qualitative research (Sarantakos, 2005). The interviews were conducted with two groups of people: the clothing manufacturers engaged in the production of ready-to-wear clothing and the stakeholders identified to be of significance to the study. The interviews were conducted to analyse the sizing system used by the companies and other issues relating to clothing manufacturing. An interview guide prepared, piloted to establish the validity and reliability was administered to the clothing manufacturers and stakeholders. Initial contacts were established with the clothing manufacturing companies, and the stakeholders through official letters obtained from the Head of the Clothing Design and Technology in Manchester Metropolitan University (MMU). The letter introduced the researcher and her research area, which made it easier for the researcher to be accepted by the clothing manufacturers and the stakeholders (See Appendix A). A letter prepared by the researcher was sent to the individual companies and stakeholder as a follow-up prior to the interviews (See Appendix B). Interviews dates and times were scheduled with the prospective participants at their own convenience.

4.3.1 Sampling Procedures and Sample Size

Purposive sampling method was used to obtain the sample size as it is essentially strategic and entails an attempt to establish a good correspondence between the research questions and sampling (Creswell, 2009). The two regions, twenty clothing manufacturers and four stakeholders were purposively sampled from the study area. Two regions, Accra in the Greater Accra and Kumasi in the Ashanti region have the highest level of concentration of clothing companies (Ghana

Statistical Services, 2008; JICA, 2008). In the geographical sense, these two regions are positioned strategically in the country. Greater Accra is the capital of Ghana, situated in the southern part while Ashanti region is the second largest city, and situated to the northern part of country. As part of decentralising of government, Greater Accra region had been made to coordinate the activities of the southern part of the country while Ashanti region also coordinates the activities of the northern part of the country. The second part of the sampling outlines the selection of clothing manufacturing companies and third part focuses on the selection of the stakeholders.

4.3.2 Sample Selection for Clothing Manufacturers

The sample size was drawn from clothing manufacturers in the Greater Accra and Ashanti regions. The researcher could not obtain national official statistical data on clothing manufacturing companies from the Ministry of Trade and Industry as it was not available. The researcher however, obtained membership list of clothing manufacturers from five sources:

1. A report of an Industrial Study Database on clothing manufacturing companies from the Department of Fashion Design and Textiles in Accra Polytechnic,
2. Membership list of clothing manufacturers from the Association of Ghana Industries (AGI),
3. Membership list of clothing manufacturers from the National Board for Small Scale Industries (NBSSI),
4. List of clothing manufacturers registered under Presidential Special Initiative (PSI) for Garments and Textiles, under the Ministry of Trade and Industry,
5. Membership list from the Greater Accra chapter of Tailors and Dressmakers Association.

The membership list obtained from Tailors and Dressmakers Association was not included in the selection process because the majority of companies operate mainly as micro and small-scale enterprises producing predominantly customised clothing. The researcher realised that the majority of companies were not producing ready-to-wear clothing and some others were currently not operative and out of business. This was attributed to the fact that most of the lists obtained have not been updated for the past 2-3 years. The majority of companies were drawn from the Industrial Database Report obtained from the Department of

Fashion design and Textiles, Accra polytechnic as it was well documented and conducted recently. The report provided accurate company's contact addresses, telephone numbers and information on clothing production speciality, which made it easier for the researcher to make selection and establish contacts. Two hundred and forty five different companies were obtained from the four sources. Table 4.1 shows the statistical data of clothing companies compiled from the four sources.

Table 4.1 List of Clothing Companies

Sources of Information	Number of Companies Compiled
A Report of an Industrial Study Database	40
National Board for Small-Scale Industries (NBSSI)	55
Association of Ghana industries(AGI)	143
Presidential Special Initiative on Textiles and Garment (PSI)	7
Total	245

Purposive sampling method was considered appropriate due to the nature of the study and the information needed to be obtained. Purposive sampling allows the researcher to select purposively in terms of criteria that are central to the main topic of a study and critically set parameters of the population (Denzin and Lincoln, 2008; Silverman, 2001). The criteria used by the researcher for the selection of the clothing companies were; the region where the clothing companies were located, the type of clothing they produce and the size of the company based on the classification of industries by UNIDO. This was to ensure that the views of all types of clothing manufacturing companies were captured fully. The classifications of the industries based on UNIDO definition are outlined below;

1. Large - company with 100+ workers
2. Medium - company with 20 - 99 workers
3. Small - company with 5 - 19 workers
4. Micro - company with < 5 workers

Sixty-five companies who met the criteria were initially sampled. The final selection of the clothing companies were predetermined by criteria relevant to this study, which was to sample out only companies producing solely ready-to-wear

clothing for women. Twenty companies were purposively selected as they met the set criteria. With the 20 clothing companies selected, 9 companies were operating as micro-small scale industries (0-19), 8 companies were operating as medium scale industries (20-99) and 3 companies were operating as large scale industries (100 and above).

4.3.3 Sample Selection for Stakeholders

Ten stakeholders were identified as having links with the clothing industry. (See the full profiles of organisations in Appendix D). Four out of the ten stakeholders were selected after studying their profiles. The criterion for the selection was on the level of involvement of the stakeholders in the clothing industry. The stakeholders included, Presidential Special Initiative (PSI) on Garment and Textiles under the Ministry of Trade and Industry, Ghana Standards Board (STB), Association of Industries (AGI) and Textile/Garment Training Centre Ghana (Table 4.2 Profile of Selected Stakeholders). Initial contacts were made by sending official letters obtained from the Head of Clothing Design and Technology, Manchester Metropolitan University to the stakeholders four months before the actual interview period. A follow up was carried up with a second letter written by the researcher prior to the interview period (See Appendix C). This gave the researcher ample time to plan and the stakeholder' time to respond and prepare themselves for the interview. The letters informed them about the researcher's intensions.

Table 4.2 Profiles of Selected Stakeholders

	Name of Stakeholder	*Responsibilities of Organisations*
1	Ghana Standards Board (STB)	It is the national standards body on behalf of the Ministry of Trade and Industry (MOTI). It is responsible for National Standards development and dissemination; testing services; inspection services and product, certification scheme; promoting quality management systems in Industry. (GSB Handbook, 2007)
2	Association of Industries (AGI)	It is a not-for-profit organisation, registered in Ghana. It advocates for policies that will enhance the effectiveness of markets and strengthen the competitiveness of local industries. It generates opportunities for private business and create employment (AGI Newsletter, 2009)
3	Presidential Special Initiative (PSI) on Garment and Textiles	It was established to ginger public-private sector partnership and create some more jobs within the clothing and textiles sector, establish and operate medium-scale manufacturing plants for clothing, help Ghanaian entrepreneurs to become merchant clothing exporters and help the small-scale tailors and seamstresses.

4	Textile/Garment Training Centre (TGTC)	A training centre or laboratory established by the government in collaboration with UNIDO to be used to up-grade skills of textile and clothing industries.

4.3.4 Development of Interview Schedule

Two sets of semi-structured interview questions were prepared for clothing manufacturers and stakeholders as shown in Appendices E and F. The interview guide for the clothing manufacturers was developed in four parts; personal profile of the participants, company's profile, key issues regarding clothing sizing and fit, key body measurements and the Ghanaian clothing industry. The interview schedule for the stakeholders was in three parts. They included the stakeholder's profile, key issues regarding clothing standards, policies and issues affecting the clothing industry in Ghana.

4.3.5 Planning the Interview

The planning of the interview took four months because it involved the following aspects; establishing initial contacts with companies and stakeholders while the researcher was far from the study area, developing, piloting of questions, making the necessary amendments and considering financial implications. The national calendar of Ghana was used in planning the interviews to ensure high response rate. Data was collected between January and March 2009. A planning schedule for each interview was devised. It included interview days, time and location. Letters sent to the companies explained the aim of the study, the rationale, the methodology, the intended outcomes and how the data would be treated after the session.

4.3.6 Piloting the Interview Questions

A pilot study was conducted prior to the main survey. The pilot study allowed the researcher to test a specific procedure during a trial run, ensuring that the information being collected could be analysed (Clark, 1999). Pilot study also enabled researchers check for any ambiguities thereby helping to eliminate any biases (Bryman, 2007). Conducting pilot does not necessarily mean adding questions and greater complexity but simplifying questions (Oppenheim, 1992). Interview questions were piloted with two Ghanaian companies: one large-scale and one small-scale. The pilot was to test and assess the actual responses given

to the questions, establish the clarity of the questions, estimate of time, the interest and response of the participant, and the effectiveness of the recorders. A few questions were modified and further developed for the main study.

4.3.7 The Main Study

The main interviews were conducted with the clothing manufacturers and stakeholders in Accra and Kumasi. The interviews were conducted according to the schedule days for the various manufacturers and stakeholders. A written consent form was presented during interview periods and read to the participants before each section began (See Appendix G). A face-to-face interviewing method was used. A rapport was developed with the participants, which helped them to relax during the sections. The participants gave their verbal consent before each interview session began. The medium of communication was in English. Provision was however made for interviewing, interpretation and transcription using local languages. The modified questions were administered. The minimum time for the interview was an hour while the maximum was an hour and thirty minutes. All interviews were conducted in the participants preferred place. Participants were designer/proprietors or managers, heads of departments or supervisors. The interviews were recorded with two audio recorders after permission was sought from each participant. This was to ensure that all data were captured and secured. The use of the recorders allowed the researcher to concentrate and assure the participants of the researcher's full concentration and attention. Silverman (2001) indicated that using tapes have advantages over other recording methods as they can be replayed and transcripts improved. A coding process was used to ensure easy recording and transcription of the interviews.

4.4 Focus Group Discussions

An evaluation of consumer perception of body shape and size, body cathexis, and their effect on clothing choice was performed following the collection of data obtained using two methods: focus group discussions and questionnaire therefore addressing Aim 2 of this study. The first part discusses the focus groups discussion and the second part focuses on the questionnaire for consumers. Focus group discussion provide a more realistic account of the perception of people, the process of arguing which offered the researcher the opportunity to study the ways in which individuals collectively make sense of a phenomenon and

construct meanings around it (Krueger, 1994). According to Morgan (1998), with focus group discussion groups are easily managed; this requires little amount of financial resources; obtains lots of information because it allows topics to be explored, and creates interaction that yield lots of information for the researcher. For this study, four groups with six participants each were formed. The participants were categorised into age groups of 18-22, 23-27, 28-31 and 32-35 years. This size of the group was decided upon because it has been proven an ideal number as it allows personal contact within the participants (Morgan, 1988; Kruger, 1998; Sarantakos, 2005; Bryman, 2007). Although this study focuses on women aged between 16-35 years as proposed and justified in Chapter 5 Section 5.1, the age bracket used for the focus group discussion was between 18-35 years. This was to ensure maximum participation from participants. Table 4.3 shows the background information of each participant.

Table 4.3 Background of Focus Group Participants

Groups	Codes for Participants	Age Groups of Participants (Years)	Age of Each Participant (Years)	Married Status	Child birth Status (No. of Children)
FG/A1- FG/A6	FG/A1	18-22 years	19	Single	-
	FG/A2		18	Single	-
	FG/A3		18	Single	-
	FG/A4		22	Single	-
	FG/A5		21	Single	-
	FG/A6		20	Single	-
FG/B1- FG/B6	FG/B1	23-27 years	27	Married	1
	FG/B2		24	Single	-
	FG/B3		25	Single	-
	FG/B4		23	Single	-
	FG/B5		26	Married	1
	FG/B6		23	Single	-
FG/C1- FG/C6	FG/C1	28-31 years	31	Single	-
	FG/C2		28	Single	-
	FG/C3		30	Married	3
	FG/C4		30	Married	2
	FG/C5		29	Married	2
	FG/C6		29	Married	1
FG/D1- FG/D6	FG/D1	32-35 years	35	Single	-
	FG/D2		32	Single	-
	FG/D3		34	Married	2
	FG/D4		34	Married	1
	FG/D5		33	Married	3
	FG/D6		32	Single	-

4.4.1 Sampling Procedure for Focus Groups

Sampling procedure started with multiple-choice pre-selection questionnaires, which was drafted and piloted (As shown in Appendix H). Adjustments were made

and administered to the sampled participants. Subjects who took part in the anthropometric survey in the two regions were purposively sampled. This was carried out by engaging some of the subjects in conversation to find out their interest and knowledge in clothing sizes and body shape. Eighty subjects who could express their views and willing to be part of the discussions were asked to fill the multiple-choice pre-selection questionnaires to help in the selection of the desired number. Out of the 80 questionnaires distributed 75 were completed. Four components used as key factors to select the desired number were initially selected based on specific criteria as follows;

- Age of participants
- Ethnicity
- Patronising ready to-wear clothing
- Clothing sizes
- Fashionable or fashion inclined
- Willing to be part of the discussion

Twenty-four participants were purposively sampled based on criteria set. Four groups with six participants in each group were formed as proposed by this study. Morgan (1998) concurs with Krueger (1994) that the typical group size of a focus group with six to ten members may be idea. The selected participants were contacted on the addresses and phone numbers supplied during the anthropometric survey.

4.4.2 Devising Themes for Discussions

The themes for the discussion were developed from Aim 2 of this study. Themes were on body shape, body size, clothing sizing and fit, ready-to-wear clothing, clothing choice and the clothing industry in Ghana. These themes were built to help eliminate differences in language, inconsistency in all the groups in order to produce analysis that is more efficient. The interview schedule started with more general ones on ready-to-wear clothing, then to more specific ones on body shape, body cathexis and clothing choice and finally on the performance of the local producers.

4.4.3 The Pilot Study

A pilot study was conducted using a convenient sample consisting of students from Accra Polytechnic in the Department of Fashion Design and Textiles, ages between 20-27 years, within the proposed age group for the study. The rationale in choosing this age group was because they have similarities with the main group. The objective of the pilot was to test the behaviour and performance of each participant in a group discussion, help in the groupings of the selected participants, estimate time, assess the relevance and the appropriateness of the questions and test the instrument to be used. The interview schedule prepared for the main study was used for the pilot. There were no modifications made to the question guide as they yielded right responses (See Appendix I). After evaluating the results, it was revealed that the group opened up and contributed immensely to the discussions. This was probably because they have common interest because of their ages. Though the familiarity was an advantage there were a few interruptions, which occurred but the advantage, outweighed the disadvantages. The time estimated was an hour and thirty minutes for the discussion. This allowed the group to exhaust the themes raised. The observation made during the pilot study assisted in handling the main study by helping the researcher moderate the discussions with the maximum control.

4.4.4 The Main Study

Participants were briefed on the purpose of the study and after this, meetings were arranged. The date, time and venue for the discussions were communicated verbally to each participant. The discussion took place in Accra and Kumasi Polytechnics in prepared conducive rooms. Equipment and materials to be used were arranged before each session began (Krueger and Casey, 2000; Sarantakos, 2001). All participants signed consent forms (See Appendix G). The four sessions of the discussion ran for two weeks. Each session lasted for an hour and thirty minutes. Special numbers were developed instead of using real names and assigned to each participant before the discussions began. This arrangement was to aid in easy identification when transcribing and to assure participants of confidentiality and anonymity.

Discussions from the sessions were tape-recorded. The reasons for recording the session and the format of the focus session were explained to them before the

session started. The rules to guide the smooth running of the discussions were read to the participants in accordance with Bryman (2007) before each session began (See Appendix I). Participants were asked to introduce and to give brief background information about themselves. This helped each participant to settle well in the group and to help the researcher to identify the various voices during transcription. After each session participants were asked to fill a form indicating their age and region in which they were born. The weights, heights and three body measurements; bust, waist and hip of each participant were taken and recorded as additional information for the purposes of analysis.

4.5 Questionnaire for Consumers

The questionnaire survey for consumers was used as a second method of collecting data in order to evaluate consumer perception of body shape and size, body cathexis and their effect on clothing choice to order to address Aim 2 of the study. According to Sarantakos (2005), surveys are methods of data collection in which information is gathered through oral or written questioning. Questionnaire was chosen as it deals with the opinions, attitude, respondents motivation and level of familiarity with the study (Frankfort-Nachmias and Nachmias, 1996). This method of data collection ensured a high response rate because the researcher carried out the distribution and collection of the questionnaires. They required less time and energy to administer, offered greater assurance of anonymity because respondents names were not required on the completed questionnaire and provided less opportunity for bias as they were presented in a consistent manner and all the questions were closed ended, which made it easier to compare the responses to each item.

4.5.1 Development of Questionnaires for Consumers

The questionnaire consisted of closed questions. Likert scale questions were used for the questionnaire because they involve studying attitudes as the respond categories range between two extreme positions divided into five points corresponding to a verbal-numerical scale (Sarantakos, 2004). The questionnaire consisted of background information and three major sections; body cathexis, body shape and clothing choice. Section A of the questionnaire consisted of 15 questions related to body cathexis. Respondents were asked to rate the degree of satisfaction of body parts using a five-point Likert scale, from very satisfied (5) to

very dissatisfied (1). The items related to body cathexis were an adaptation of the Body Areas Satisfaction Subscale (BASS) developed by Cash (2000). Section B consisted of the 23 questions related to clothing choice. Respondents were asked to indicate their current clothing choice by indicating if they wore certain clothing based on characteristics such as length, style, colour, and fit. The response scale using a five-likert scale ranging from always (5) and never (1) was used. Section C of the questionnaire consisted of three questions related to body shape. Section D consisting of six questions to obtain demographic information from respondents included age, income, occupation, education, marital and childbirth status. (See Appendix J)

4.5.2 Sampling Procedures for Consumers

The sample size was selected from the study areas as explained in Chapter 4 Section 4.2.3. The sampling procedure used for the survey was non-probability purposive sampling technique in which the element of the population are not deliberately given equal opportunity to be included in the sampling. The sample was drawn from five institutions namely; Ministry of Education, Ministry of Trade and Industry, Bank of Ghana, Kasapa Mobile Company and Ghana Workers College. Two polytechnics in the Greater Accra and Ashanti regions were also selected. This was to ensure a fair representation of women between the ages of 18-35 years who have different ethnic backgrounds. 400 women who were within the age limit for this study, and from these institutions were sampled. 220 women from Greater Accra and 180 women from Ashanti regions formed the final sample size.

4.5.3 Piloting and Administering of Questionnaire

A pretesting trial administration of the questionnaire was conducted with six research students to determine whether the questions are clear and they understand what is required of them. The clarity and understanding of the questions were noted. Suggestions for improvement were also solicited from fellow colleagues. The questionnaire was piloted using 30 respondents to establish accessibility and suitability of the questions and the method adopted. Minor changes were made to clarify of some of the questions. The questionnaire was revised. The amount of time needed to complete the questionnaire was 5-10 minutes. The designed questionnaires were printed and administered to 400

women in the study area. The questionnaire was distributed to 220 women in Accra and 180 in Kumasi. Three hundred and eighty one filled questionnaires, a response rate of 95.25%, were collected and analysed.

4.6 Ethical Issues

Conducting research requires expertise, diligence, honesty and integrity. A study could be rendered ethical when the rights of self-determination, anonymity, confidentiality and informed consent were observed. For this study, written permission to conduct the study was obtained from the institutions involved. Letters sent before the interviews to the clothing manufacturers and stakeholders fully informed them of the nature of the study and the implications of their participation at the beginning of each session of the interviews. An informed consent form was designed for the participants of the interviews, focus group discussion and questionnaires. The participants were informed of their right to participate or decline and to withdraw at any point before they were made to sign a consent form. The researcher informed participants about the purpose of the study and the procedures that would be used to collect the data and assured them of anonymity and confidentiality. Anonymity was ensured by excluding the names of participants on the questionnaire. For confidentiality, transcripts were separated from the actual work and special numbers used in place of names for the interviews and the focus groups (Neuman, 2000).

4.7 Data Analysis

The data was analysed both qualitatively and quantitatively. The interviews and focus group discussions were analysed using the grounded theory method, a framework for analysing qualitative data developed by Strauss and Corbin (1990). A systematic approach of grounded theory was used in collecting and analysing of data as described in Section 4.2.5. The quantitative method was used in analysing the questionnaire and the anthropometric survey. The frequencies and percentages of the demographic characteristics of the respondents were calculated to describe the data collected. Results of the survey were recorded in a spreadsheet and transferred to SPSS for statistical analysis. A statistical software program, SPSS (Statistical Package for Social Sciences, Version 18.0) was used for in-depth data analyses. One-way analysis of variance (ANOVA) was used to compare mean differences between the variables and a post hoc multiple

comparison Scheffe test was used to determine the difference within the variables. The analysis of the data is presented in Chapter 7 Section 7.9.

4.8 Chapter Summary

In this chapter, the research methods and procedures used in obtaining data for the study were discussed. Quantitative and qualitative research methods, which included four data collection strategies, interviews, focus group discussions and questionnaire survey were used. The qualitative data was obtained using interviews and focus group discussion approaches based on the grounded theory developed by Strauss and Corbin (1990, 1998). The quantitative method collected using questionnaire survey was analysed statistically using Statistical Package for Social Sciences software (SPSS Version 18.0).

A non-probability purposive sampling method was used to select 20 clothing manufacturers and 4 stakeholders for the interview. Two sets of semi structured interview guides were developed based on the existing literature and administered face-to-face to the clothing manufacturers and the stakeholders. The aim of the interview was to analyse the current sizing systems used for the production of ready-to-wear clothing, issues on clothing fit, clothing standards and policies and the clothing industry in Ghana. Face to face semi-structured interview method helped the researcher to obtain the needed information from clothing manufacturers and stakeholders in Ghana. The pilot study was conducted before the main study, as this was to make sure the questions were the right ones that will yield the right answers.

The focus group discussion and questionnaire survey methods were used for obtaining information from clothing consumers. For the focus group discussions, the sampling method, the pre-selection of participants, the pilot study and the main study were discussed. The non-probability purposive sampling was used in selecting 24 Ghanaian women between the ages of 18-35 years for the group discussions. Four groups made up of six participants were formed. A question route was developed and used to evaluate the body shape and size, body cathexis and clothing choice. A pre-tested and piloted questionnaire developed based on the themes generated from the focus groups were administered to 400 women between the ages of 18-35 years. A non-probability purposive sampling was used

for the selection of women from some government and private organisations and two polytechnics, in Kumasi and Accra.

Finally, the chapter discussed the ethical issues, which needed to be addressed. A consent form was presented during the interviews, focus group discussions and questionnaire survey. The methods used for analysing all the data collected for the purpose of study were discussed. Qualitative data was analysed using the grounded theory and quantitative data were analysed using the Statistical Package for Social Sciences Version 18.0.

Chapter 5: Research Methodology for Anthropometric Survey

5.1 Introduction

The chapter explains the methodology adopted for the anthropometric survey conducted in Ghana between November 2008 and March 2009. The objective of the survey was to develop a size chart based on anthropometric body measurements of Ghanaian women aged 16-35 years. Pheasant (1990) proposed that 500-1000 subjects are adequate for a survey of this nature and would provide desirable results. Vronti (2005) in a similar study measured 800 women in Cyprus for developing size charts. This age bracket chosen was based on the definition of youth by the Ministry of Youth and Sports Ghana (Ministry of Youth and Sport, 2010) as they have been identified as a group which patronise ready-to-wear clothing than any other group in Ghana (Matthews, 1979). Subjects were requested to sign a consent form before body measurements were taken. Special undergarments were used in order to obtain accurate results. Manual measurement technologies, which involves tape measure for girth measurements, balance scale for weight and height stadiometer was employed. The process involved two trained assistants at a time, with one taking the measurements and the other recording the measurements. Research assistants were trained for both the pilot and the main survey. Two centres were set for the survey.

Conducting anthropometric survey requires a great deal of organisation and planning. Issues considered include, locating of the subjects, consent by the various authorities, expenses, space and time (Roebuck, 1995; Beazley, 1997; Pheasant, 1998; Otieno, 1998; Ashdown, 1998; Gupta and Gangadhar, 2004). This chapter therefore discusses the processes involved in conducting the survey.

Issues discussed in the first phase of this chapter include establishing contacts with various institutions, equipment used for taking body measurements, recruitment of research assistants and training of measurers and recorders. The second phase discusses the pilot study conducted and its findings and the third phase focuses on the activities carried out in the main survey; sampling procedures adopted, measuring and recording procedures, data analysis strategy, ethical issues and method used in the developing the size charts.

5.2 Establishing Contacts with Various Institutions and Organisations

Official letters were sent four months prior to the survey to seek permission from the two Polytechnics in Accra and Kumasi. The permission was necessary because the researcher realised that specific facilities such as space, equipment and human resource would be needed from these institutions (See Appendix A and B). Approval letters were received in good time to help the researcher prepare towards the survey. Contacts were also established through letters with some selected vocational institutions, clothing and hairdressing training centres. The aim of the survey and the role they would play were explained to them. Meetings were held in the various institutions to explain the aim of the research and the body measurement taking exercise to students. Posters and leaflets were designed and posted on the various notice boards after obtaining accreditation from the Public Relations offices of the institutions. Leaflets were distributed randomly to women within and around the campuses by the researcher and the assistants. This was to boost publicity and create awareness.

5.3 Manual Anthropometrical Equipment

Equipment used for landmarks, measuring and recording for the anthropometric survey included paper adhesives, ink, tape measures and cords, mentholated spirit and cotton wool, hair bands and clips, pens and pencils, height stand and balanced scales. Each of these tools and how they were used in the survey is explained.

1. Height stand graduated in centimetres and millimetres was used for taking the height of subjects.
2. Paper adhesive were circle in shape and in colours. The centres of the circles were marked with a visible ink which formed X shape at the centre. They were used for the landmarks. The type of adhesive used was carefully chosen based

on the information given by the manufacturer. Precautions were however taken if any of the subjects react to the adhesives.

3. Tape measures dimensionally stable, approximately 15mm wide and accurately graduated in millimetres were used for measuring. The accuracy of the tape measure was checked at the beginning of every session of body measurement taking.
4. Spirit level was used to establish that the metre rule was perpendicular to the ground when measuring height.
5. A digital balance scale was used to take the weight of an individual subjects. This was preferred over the manual scale because of the accuracy in the results. The scale was calibrated for each subject by following the manufacturer's manual.
6. Two medium trolleys with three shelves each were used in carrying all the equipment needed and were positioned at a convenience place for the reach of the measurers and the recorders.
7. Elastic tapes were used for the girth measurements to locate measuring positions.
8. Hair clips and bands were provided for those who had long or braided hair for tying when taking height measurement.
9. Recording sheets containing the 32 body measurements positions arranged in an orderly manner were used for recording personal information and body measurements.
10. Desks and chairs were used by the recorders to make the recording of the measurements less strenuous and comfortable.
11. Mentholated spirit was used on all the surfaces to avoid the risk of transferring skin problems to other subjects because of the direct contact with the skin.
12. Cotton wool was used with the mentholated spirit to clean the instruments used directly on subjects.
13. Dressing mirrors were used in order to help the measurers to put the tape around the accurate girth positions.

5.4 Recruitment of Research Assistants

The research assistants were recruited in Accra and used for the survey. After recommendations made by some lecturers of the Department of Fashion Design and Textiles, 15 immediate past students from the department were purposively sampled and contacted. The criterion for the selection was based on their previous

knowledge and skills acquired in taking body measurements. Out of the 15 contacts, 13 of them responded positively. The purpose of the anthropometric survey and the role they would be playing was explained to them. They were then taken through two weeks of intensive training to ensure reliability and validity of the data (Cameron, 1982; Otieno, 1989). Ten trainees were selected based on their performance when they were assessed after the training.

5.5 Training of Measurers and Recorders

Prepared training materials were given to the selected past students prior to the training period. These materials included a manual on how to identify anatomical points, placing landmark, using and handling of equipment, taking body measurements, recording body measurements, communication skills and behavioural management. Various terms explained to the research assistants included measurer, recorder, subject and girth as they were vital for the smooth communication between the measurers and the recorders (See Appendix P). The manual method of taking body measurements was used. Even though scanners are widely used by developed countries in recent years, this method was unavailable to the researcher. The manual method has been used alongside the body scanners for a large number of surveys for example the Size UK, Size USA and Germany for measurements that require the use of manual method only and where scanners are not available.

The body measurements were taken in conformity with the International Organisation for Standardisation (ISO 8559, 1989) to ensure reliability and validity of the results. The standard defines the location of body dimensions and also specifies the standard procedure for measuring the body. The international Standard has become the benchmark for other standards. The European Standards EN 13402 (Part, 1, 2, 3) were developed based on the ISO standards with the intention of integrating body measurement and developing a common designation system across Europe. Determining anatomical points and placing landmarks as a preparatory state prior to measurement taking were based on the previous work done by Kunick (1984) and Beazley (1997). The body measurements were recorded on the researchers recording sheet. 3 other variables including age, dress size and region of birth were also recorded. The items on the recording sheet were checked for accuracy, consistency and systematic arrangement before finally printed and used for the pilot study. The

trainees practiced the procedure by measuring and recording in turns. This was to ensure that all trainees could perform both functions when the need arose. Comparisons of measurements were made to ascertain the level of accuracy and precision. A variation of ±5mm on length and small measurements and ±10mm on a full round girth measurements as suggested acceptable by Beazley (1997) was used to access the performance of the trainees. Eight of the trainees were selected and used for both the pilot study and the main survey.

The difficulties encountered by the research assistants were measuring the neck girths. Chainnette was used in taking the curve measurements, which eased the difficulty in using tape measures as suggested suitable by other researchers (Beazley, 1998; Otieno, 1998). There were some recording errors when measurements taken were checked. A few of the recorded measurements did not match up with some particular body measurements during the comparison. Some of the figures were interchanged to read the opposite for instance 76 has been written 67 due to recording errors. The assessment of these tasks helped in selecting 10 trainees who met the standards set for the survey.

5.6 The Pilot Study

A pilot study was conducted in January 2009 in Accra Polytechnic and the sample size included three departments: Department of Fashion Design and Textiles, Department of Secretaryship and Management Studies and Department of Hotel, Catering and Institutional Management. This study was conducted prior to the main survey. Eighty subjects, ages between 16-35 years, representing 10% of the actual sample size were measured as suggested by Oppendiem (1992) as idea number for pilots. This age group was chosen because they fall within the age limit for the survey. The pilot study was conducted to test equipment, measuring procedures, ascertain the actual time to be spent on each subject, accuracy of measurements taking and recording and establishing the sequence of measurements. Pilot study saves time, organisational problems related to the whole study and administrative matters concerning sampling are realised, key aims are conceptualised and the researcher is able to make tangible preparation for fieldwork and subsequently analysis (Oppenheim, 1992; Sarantakos, 2005). In similar studies researchers carried out pilot studies which helped in the determination of the sequence of measurements, management of subjects, choice

and appropriateness of equipment and allocation of time during data collection (Otieno, 1998; Vronti, 2005). The pilot was carried out in the prepared facilities, which were used for the actual survey. Thirty two measurements and three other variables, age, region by birth and dress size were taken and recorded from a subject as proposed for the survey. This was to enable the researcher to detect any abnormality and uncomfortable situations that needed to be addressed, to establish the amount of time to be spent on each subject during the actual survey and to address all administrative problems. The research assistants also had the opportunity to familiarise themselves with the behaviour and management of people.

5.6.1 Findings of the Pilot Study

In the pilot study, it was realised that undressing and re-dressing affected the time allocation for each subject. Time was also spent on explaining the ethical issues and the special undergarments provided for the subjects to wear on individual levels. This was done to reassure them of confidentiality and anonymity. These activities helped in the final estimation of time to be spent on each subject from undressing to the measurements taking and to dressing up again for the main study. Between 15-20 minutes was spent with each subject prior to the body measurement taking.

It was also realised that all the measurement positions put on 2 A-4 sheets could be compressed on one sheet to make it handy and easy for the recorders. This was redesigned, printed and photocopied for the actual survey. The items on the recording sheets were also modified to reduce to make body measurements taking and recordings easier and faster as well as data entry. The acronyms, however, for the various positions used for measuring remained the same. The ethical issues involved in the exercise were explained to the research assistants. They were advised to handle subjects with all dignity and respect. This helped in the main survey as effective communication between the subjects and the research assistants was realised. The research assistants were briefed on the outcome of the pilot study and reminded of the key role they need to play in the survey.

5.7 Sampling Procedures and Sample Size

Sampling was carried out in three stages; selection of regions, institutions and subjects. Purposive sampling technique (Bryman 2007; Creswell, 2007) was used to select Accra in the Greater Accra and Kumasi in the Ashanti regions. The selection of these two regions has been explained in Chapter 4 Section 4.3.1. Twelve institutions and 20 training centres were also purposively selected from the tertiary, vocational and other training centres in the two regions. These institutions met the criteria set for the study and were strategically positioned closer to the survey centres. This was to reduce inconvenience of having to travel long distances and encouraging people to participate. Out of the 12 institutions, two could not participate in the survey. Five out of the 20 training centres also refused to take part in the body measurements survey on ground that the exercise would disrupt the academic calendar. The initial plan to random sample the women from the various institutions for the survey was abandoned because of the nature of the exercise. This was realised after the pilot study as the women were persuaded to take part in the survey. Due to the cultural and religious beliefs, most of the women did not want to be seen only in their undergarments so they declined to be measured. This left the researcher with no option but to make it voluntary to any woman who met the set age limit. Women who voluntarily accepted to be part of the study and were within the age group were measured.

5.8 The Main Survey

The researcher placed all landmarks on the subjects before each body measurement was taken to ensure accuracy and reliability in the measurements. Since the research assistants were trained for both measuring and recording, they interchanged roles to ensure the continuity of the exercise, which created a relaxed atmosphere for the research assistants. Two research assistants measured subjects in specially provided undergarment in a secure and private room. The measuring procedures included the subject changing, identifying and sticking landmarks, taking body measurements, recording measurements and dressing up.

Issues discussed with the subject prior to measurement taking included ethical issues relating to one's privacy, why it was necessary for them to wear the special undergarment, health and safety issues and the right of the subjects. Subjects had

the right to withdraw from the exercise at any time before body measurements taking began. From the records, about 47 subjects withdrew from the survey at the last minute when they were asked to change into the special undergarments. The reasons could be summarised as religious, moral and personal issues. Subjects were taken into the changing room by an assistant who would help in choosing the right size of undergarments (Otieno, 2008). Changing gowns were provided for the subjects to ensure decency. Subjects were landmarked and then measured after which they proceeded to the changing room to allow the cycle to continue.

5.8.1 Special Clothing used for the Survey

Anthropometric survey requires special clothing in order to obtain accurate measurements. Outer clothing can add to the measurements therefore not giving the accurate results. Special unpadded brassier free of metal fit exactly to give a good bust measurement and brief were used as recommended by various researchers (Beazley, 1998; ISO, 8559:1989). The briefs were used to cover the lower part of the body to the knee point. This was not to interfere with the waist and the hip measurement. Bulk purchases of the undergarments were also made based on initial sizes information obtained from cross section of students.

5.8.2 Determination of Landmarks

The anatomical points were identified. Landmark marks were positioned on the body to indicate the beginning and the end of a measurement. These are generally located around a bony structure identified on the body: neck point, shoulder point, the seventh cervical bone, waist, hip, bust and knee prior to measurement. 13 Landmarks were positioned by identifying the anatomical points on the body and marking them with visible adhesives. The mid points of the round shaped removable paper adhesives were determined by crossing with a visible ink (Kunick, 1984; Beazley, 1997; Otieno, 1998). The landmarks were positioned on the 7^{th} cervical point, long and short shoulders, neck point, centre front neck, neckline, waist line, hip, upper hip, elbow, knee and ankle and the two armscyes (See Appendix K). Emphasis was laid on the right side of the body since somebody measurements were taking from the right side. Landmarks were removed after the completion of body measurement taking without causing harm to the body. These landmarks were identified as follows.

1) 7th Cervical-The first landmark was positioned at the 7th cervical which was identified by lowering the subjects' head.
2) The long shoulder was located at the end of the acromiase (long shoulder bone point) by palpation and a landmark was positioned at both the left and right shoulders of the subject.
3) The short shoulder was also located at the end of the acromio-clavicular (short shoulder bone point) joint where landmarks were positions on both the left and the right sides.
4) The neck joint was positioned at the base of the neck at the higher point of the shoulder in line with the long shoulder landmark. The length from the neck to the right neck point was measured which reveals the position where the point should be located on the left side.
5) The neck base landmark was positioned in the hollow made by the supra sternal natch bones at the base of the neck.
6) Neckline was identified by positioning a landmark 2cm above the four neck base landmarks at the Adam's apple level.
7) The waist level that is the natural waist level was located by placing an elastic tape around it. Landmarks were placed at the centre front and back, and the two side seams.
8) The widest level of the hip was located. Landmarks were positioned at the centre back and front, right and left side. These were measured equally from the ground by a metal metre ruler.
9) The upper hip girth determined as the mid- point was measured between the centre back waist level and the hip level. Landmarks were positioned equally at this level from the hip level at the centre back, centre front, right and left side seam.
10) The subject was made to bend the right arm to touch her shoulder so that the end of the elbow would point out allowing measurer to mark that point with landmarks.
11) The wrist that is determined as the distal end of the ulna bone was located on the right arm of the subject and land marked.
12) With the knee level the subject bends her right knee slightly to define the crease line of the tibial knee joint space, which was landmarked.
13) Ankle level was located on the right ankle of the subject and marked.

These landmarks were located using the anatomical points. The landmarks ease any ambiguity and thereby ensuring precision in determining dimensions by achieving maximum degree of uniformity, reliability and validity (Otieno, 2008).

5.8.3 Measuring Positions

Thirty-two body measurement positions considered vital in the construction of patterns for clothing of all kinds for women were obtained. These measurements aid in the development of bodice blocks for dresses, jackets, coats, skirts, trousers and other types of clothing and undergarments for women (Cooklin, 1990; Aldrich, 2004). After the anatomical positions were determined and landmarks placed with suitable adhesive, the measuring positions were determined in between the landmarks (see Appendix K). The body measurement positions abbreviated for recording purposes is presented in the Table 5.1.

Table 5.1 Body Measurements Positions and Abbreviations

No	Body Dimension	Abbreviation/ Acronyms
1	Height	Height
2	Weight	Weight
3	Neck girth	NeckGth
4	Cervical to waist	Cerv2WL
5	Cervical to ground	Cerv2GL
6	Neck to shoulder point	Neck2SP
7	Back shoulder width	BackSW
8	Neck shoulder point to Bust	NeckS2PB
9	Neck shoulder point to waist	NecS2PW
10	Armscye girth	ArmSGth
11	Shoulder point to elbow	Shou2PE
12	Arm length	ArmLgth
13	Upper arm girth	UpperAG
14	Elbow girth	ElbwGth
15	Wrist girth	WriGth
16	Bust girth	FullBgth
17	Under bust girth	UndBgth
18	Across front	Acrosft
19	Across back	Acrosbk
20	Side Waist to hip	Sid2hp
21	Side Waist to knee	SidW2kne
22	Side Waist to ankle	SidW2ank
23	Waist girth	Wais2gth
24	Upper hip girth	UpphGth
25	Hip girth	HipGrth
26	Thigh girth	ThiGrth
27	Knee girth	KneGrth
28	Calf girth	CalGrth
29	Ankle girth	AnkGth
30	Inside leg Length	InsidlGth
31	Crotch Length	CrocGth
32	Outside leg Length	OutlGth

The details used in the measuring procedures, position of the subject and the specific equipment used for individual measurements and the source of measurements have been presented in Table 4.2. The measurements were taken in conformity with ISO standards (ISO, 8559:1989) and Beazley (1997).

Table 5.2- Measuring Positions, Equipment and Methods used

Body Dimension	Equipment	Position of Subject	Measuring Methods
1. Height	Portable wall mounted stadiometer	Stands upright, feet together	Ensure subject is standing upright , feet together, lower the sliding part of the measuring rod so that the hair is pressed flat read measurement against the height rule
2. Weight ISO 8559:1989	Digital balance scale	Stands upright, hands hanging naturally	Measurer ensures subject is at the right standing position and then takes reading.
3. Neck girth ISO 8559:1989 2.1.2	Tape measure	Stands upright	Pass round tape measure 2cm below the Adam's apple and at the level of the 7th cervical.
4. Cervical to waist ISO 8559:1989 2.2.10	Tape measure	Stands upright	Position the tape measure with zero at cervical dropping in line with the contour of the spinal column and to the waist line.
5.Cervical to ground (ISO8559:1989 2.2.12)	Tape measure	Stands upright	With tape measure at the 7th cervical follow the contour of the spinal to the level of the hip, then vertical to the ground.
6. Neck to shoulder (ISO 8559:1989 2.1.4	Tape measure	Stands upright, arms hanging naturally	Position the tape measure at the right base of the side of the neck point to the right long shoulder bone point.
7. Back shoulder Width ISO 8559: 1989 2.1.5	Tape measure	Stands upright, arms hanging naturally	Position tape measure at the left shoulder bone point and extend it to the right shoulder.
8. Neck shoulder point to bust point ISO 8559:1989 2.2.15	Tape measure	Stands upright	Position the tape measure at the intersection of the shoulder line and the neck base level, drop the tape over the greatest prominence of the bust.
9. Neck shoulder point to waist point ISO 8559: 1989 2.2.16	Tape Measure	Stand upright	Pass the tape measure from the neck shoulder point, over the nipple, then vertically straight to the front waist.
10. Armscye girth ISO 8559: 1989 -2.2.20	Tape Measure	Stands upright, hand hanging naturally	Pass the tape measure through the under- arm midpoint and vertically over the shoulder.
11.Shoulder point to elbow ISO 8559:1989 2.2.21	Tape Measure	Right fist clenched, place on the hip and arm bent at 90 degrees	Pass tape measure from the armscye/ shoulder line intersection, lower tape to the raised arm to the elbow point.
12. Arm Length ISO 8559:1989 2.2.22,	Tape Measure	Right fist clenched, place on the hip and arm bent at 90 degrees	Place tape measure from the armscye /shoulder line intersection, pass it over to the elbow to the far end of the prominence wrist bone.
13. Upper arm Girth ISO 8559: 1989, 2.1.13	Tape Measure	Stands upright, arms hanging naturally	Place the tape measure round upper arm, lower the tape over the lowest scye level.
14. Elbow girth ISO 8559:1989 2.1.14	Tape Measure	Stands upright, arms bent 90 degrees	Allow tape measure to pass round the elbow where the landmark is placed.

15. Wrist girth ISO 8559:1989 2.1.15	Tape Measure	Stands upright, arms hanging naturally	Place the tape measure over the wrist landmark and around the wrist.
16. Bust girth ISO 8559:1989 2.1.8	Tape Measure	Stands upright, with normal breathing	Pass tape measure over the shoulder blades, under the armpits and across the nipples.
17. Under bust Girth ISO 8559: 1989 2.1.10	Tape Measure	Stands upright	Place tape measure around the horizontal girth of the body just below the breasts level.
18. Across Front	Tape Measure	Stands upright	Place the tape between the left and right armscyes at the front.
20. Across back (Back width)	Tape Measure	Stands upright	Place the tape between the left and right scye levels from back
19. Side waist to Hip ISO 8559:1989 2.2.17	Tape Measure	Stands upright	Place the tape at the side of the body from the natural waist level to the hip at the level of greatest prominence of the hip.
21. Side waist to knee Beazley, 1997	Tape measure	Stands upright	Place the tape at the side of the waist landmark release it to fall down to the knee landmark.
22. Side waist to ankle Beazley, 1997	Tape measure	Stands upright	Place the tape at the side of the waist line release it to fall down to the ankle landmark.
23. Waist girth ISO 8559:1989 2.2.11	Tape measure	Normal breathing stands upright with abdomen relaxed	Place tape firmly at the natural waist line between the top of the hip bone and the lower ribs making sure the tape goes over the four landmarks.
24. Upper hip Girth Beazley, 1997	Tape Measure	Stands upright	Pass the tape measure in between the waistline and the hip, place the tape over the landmarks at the centre front, centre back and left and right sides.
25. Hip girth ISO 8559:1989 2.1.12	Tape measure	Stands upright	Pass the tape measure round the greatest prominence, place tape firmly at four landmarks of the midpoint between the centre back waist level and the hip.
26. Thigh girth ISO 8559:1989 2.1.18	Tape Measure	Stands upright	Position the tape at the highest part of the upper thigh below the crutch.
27. Knee girth ISO 8559:1989 2.1.20	Tape Measure	Stands upright	Place the tape measure over the tibiale (knee bone point) landmark mark in the horizontal plane without restrictions.
28. Calf girth ISO 8559:1989 2.1.22	Tape Measure	Stands upright, with legs slightly apart, body mass equally distributed	Place tape measure at the landmark, round the largest part of the calf without restriction.
29. Ankle girth ISO 8559:1989 2.1.24	Tape Measure	Stands upright	Pass tape measure round the leg measure at the level of the centre of the ankle bone.
30. Inside leg Length ISO 8559:1985 2.2.27,	Tape Measure	Stands upright, legs slightly apart, body mass equally distributed on legs.	Pass the tape measure in a s0traight line the distance between the crotch and the sole of the feet.
31. Outside leg length ISO 8559:1985 2.2.25	Tape measure	Stands upright	Pass the tape measure at the distance from the waist to the ground, follow the contour of hip then vertically.
32. Crotch length ISO 8559:1989 2.2.19	Tape measure	Stands upright	Pass the tape measure from the centre of the natural waist level at the front of the body, through the crotch to the centre of the back at the waist level.

Most researchers have measured both the neck girth and neck base girth based on the neckline and the neck base landmarks (Beazley, 1997, Kunick, 1984). The ISO: 8559 (1989) standard include the neck measurements. Although this study measured the neckline, further studies on this population should consider exploring the neck base measurements.

5.8.4 Recording Measurements

The recording sheet was designed to contain all the 32 measurements and other 3 variables (age, dress size, region) that were important to the study. Each recorded sheet was assigned a serial number to help cross check any anomalies on the data entry (See Appendix L). The measurers mention the figures to the recorders loud and clear twice. This ensured that the data figures were captured correctly and recorded manually by the recorders. The data was input electronically after every section by the researcher. Care was taking when these figures were entered into the computer using, SPSS (Statistical Package for Social Sciences) statistical software program. For the purpose of recording measurement positions were abbreviated to make entry easier and simple.

5.9 Analysis of Data

Statistical Package for the Social Sciences (SPSS) Version 18.0 for windows was employed for data inputting and analysis. This method was chosen because it was faster and quicker in many different ways by solving complicated and often appropriate statistical techniques. Descriptive statistics including mean, standard deviation, and percentile were calculated and utilized for the analysis and correlations were determined.

5.10 Ethical Issues

Ethical issues were considered due to the nature of the survey, especially taking the measurement in only undergarments and using the manual method. A designed subject information sheet highlights on the privacy of the subject, the right of the subject to withdraw from the survey and health and safety issues. A consent form was designed and read to subjects before the measurements were taken. A verbal consent was received from subjects prior to the commencement of

the exercise. Subjects were reassured of confidentiality and anonymity. Evidence of this was the omission of names of subjects on the recording sheets (As shown in Appendix D).

5.11 Development of Size Chart

The development of the size charts involved the use of SPSS. Based on the input data the mean, standard deviation, minimum and maximum and percentiles were calculated. Size range, size codes and grading increments by using the standard deviation and mean were also determined. Pearson's correlation coefficients was calculated in order to determine relationships between dimensions and resulting in size charts (Beazley, 1998; Vronti, 2005; Otieno, 2008) with a defined size range and grading increments that are relevant to utilisation by consumers and manufacturers. The development of a body size chart was therefore based on the data obtained and the analysis made, adding ease allowance, formulating size charts; and then conducting fitting trails (Beazley and Bond, 2003) and finally confirmation of charts.

5.12 Chapter Summary

This chapter focused on procedures used for conducting anthropometric survey. It outlined the processes involved in establishing contacts with institutions to gain access to their facilities and students. It examined the equipment used, recruitment and training of research assistants, selection of body measurements, selection of subjects, special clothing, preparation of subjects, measurements taking and recording of body measurements.

The non-probability purposive sampling was used in selecting the two regions; Greater Accra and Ashanti, the various institutions and subjects for the anthropometric survey. Eight hundred and forty two Ghanaian women aged between 16-35 years were purposively sampled and measured for the study as it was considered adequate for a survey of this nature and would provide desirable results (Pheasant, 1990). This age group was identified as a group, which patronise ready-to-wear clothing more than any other age group in Ghana.

The traditional method using manual equipment and procedures were used for the survey. The manual measuring was based on the ISO 8559 (1989). Landmarks

identification and positioning were based on the previous work done by Beazley (1997). Research assistants were recruited and trained prior to the survey. The training was to ensure reliability and validity of the data. A pilot study preceded the main study to make sure that the equipment were tested and for the research assistants to familiarise themselves with the procedures and acquire the skills in taking body measurement. Findings of the pilot study helped in assessment of time and finances, planning and managing the survey. With the main study, subjects were drawn from various institutions. Posters and leaflets were designed and use as a means of advertisement to attract the right women. Subjects were made to wear special undergarment provided for the survey. Unpadded brassier free of metal which fit exactly to give a good bust measurement and briefs that covered the lower part of the body to the knee point were used. Landmarks were placed before the commencement of body measurement taking sessions. Thirty-two body measurements were taken from each subject and recorded in a prepared sheet developed for the survey.

CHAPTER 6: Analysis of Interviews for Clothing Manufacturers and Stakeholders

6.1 Introduction

This chapter presents the analysis of data obtained from interviews conducted with manufacturers and stakeholders of the clothing industry. This chapter was to analyses the current sizing systems used by manufacturing companies for the production of clothing. Semi-structured interview questionnaires were used to obtain information for the study. The sampling processes used in the selection of the clothing manufacturers and the stakeholders have been discussed fully in Chapter 4 Sections 4.3.2 and 4.3.3. The grounded theory approach was employed for analysing the data (Strauss and Corbin, 1990). This chapter presents the results of the interviews in three sections. The first section focuses on the profiles of the clothing companies and stakeholders as well as the participants. The second section presents the results of the interviews conducted with clothing manufacturers. Topics analysed include the following; source of size charts, variations in sizes, vital body measurements, coding and labelling of clothing, size range of clothing, clothing standards and policy implementation, development of national size chart, the clothing industry and the future of the industry. The third section presents the results of the interviews conducted for the stakeholders. Topics analysed include the development of national sizing system, clothing standards and government policies, perception about the clothing industry and enhancing the performance of the clothing industry.

6.2 Profile of Clothing Companies and Stakeholders

Interview sessions were conducted with 20 clothing manufacturing companies, which produce ready-to-wear clothing for women and four stakeholders. The clothing manufacturing companies interviewed included 9 micro-small scale companies with up to 19 employees, 8 medium-scale companies with between 20-99 employees and 3 large-scale with over 100 employees. These companies were selected from two metropolitan cities: Accra and Kumasi. The participants were either proprietors/managers or representatives of the respective companies.

Generally, all the companies had been established for more than six years with the exception of one company, which was established four years ago (Manu15). For easy identification and recording, codes were developed for each company. All

companies were privately owned with exception of one company, which was part of a large textile company (Manu14). Some of the companies produce for the local and national markets and others produce for both national and international markets. The profiles of all the companies who participated in the interview are presented in Table 6.1.

Table 6.1 Profile of Clothing Companies in Accra and Kumasi

Company Code	Managed by	Number Employees	Manufacturing Activities	Consumer Target group	Years in Operation
Manu01	Proprietor/Manager (Female)	S (18)	All type of clothing	20-50	20
Manu02	Proprietor/Manager (Male)	S (15)	Shirts, blouses and dresses	15-35	10
Manu03	Partnership	S (10)	Dresses, Skirts and Blouses	All ages	23
Manu04	Proprietor/Manager (Female)	M (50)	From casual to classic	20-50	23
Manu05	Proprietor/Manager (Female)	M (50)	All types of clothing	All ages	21
Manu06	Proprietor/Manager (Female)	MC (5)	All types of clothing	22-48	6
Manu07	Partnership	M (20)	Skirt & trouser suits, blouses, dress	25+	12
Manu08	Proprietor/Manager (Male)	L (100)	Shirts, blouses and dresses	All ages	15
Manu09	Proprietor /Manager (Male)	M (28)	Blouses, shirts, dresses, trousers	16-60	18
Manu10	Proprietor/Manager (Female)	S (17)	All types of clothing	All ages	26
Manu11	Proprietor/Manager (Female)	M (59)	Skirt and trouser suits, shirts and blouses	20+	17
Manu12	Proprietor/Manager (Female)	M (46)	All formal wears, bridal, traditional wears	All ages	22
Manu13	Proprietor/Manager (Male)	S (21)	All types of clothing	20-65	15
Manu14	Proprietor/Manager (Male)	M (40)	Casuals, suits and afro centric clothing	16+	8
Manu15	Proprietor/Manager (Male)	MC (5)	All types of clothing	All ages	4
Manu16	Proprietor/Manager (Male)	S (18)	Dresses, tops, two-piece and three piece boubou	18+	6
Manu17	Partnership	L(250)	Uniforms, Shirts and Skirts	18+	14
Manu18	Partnership	M(20)	Casual and formal shirts, dresses	All ages	6
Manu19	Proprietor/Manager (Male)	S (11)	All types of clothing	18+	20
Manu20	Proprietor/Manager (Female)	L (200)	All types of clothing	16-65	20

MC-Micro, S -Small Scale, M -Medium Scale, L -Large Scale

6.2.1 Profile of Participants from Clothing Companies

This section outlines the profile of the participants representing the clothing companies selected for the interviews. Twelve of the participants were owners who managed their own businesses, two participants were in partnership and the remaining six participants were employees who held various positions in their respective companies. The majority of participants were educated with university degrees, Higher National Diploma (HND) and other qualifications. Despite this number, 10 of participants did not have the degrees in clothing.

Table 6.2 Profile of Participants from Clothing Companies

Company Code	Participant Position	Educational Background	Years of Experience
Manu01	Proprietor/Manager (Female)	Diploma in Secretaryship/ Trained in Dressmaking	20
Manu02	Proprietor/Manager (Male)	Degree in Architecture/Fashion Designer	10
Manu03	Partnership/Manager (Female)	Trained in Dressmaking & Designing	23
Manu04	Proprietor /Manager (Female)	Degree in Secretaryship/Trained in Dressmaking	23
Manu05	Proprietor/Manager (Female)	Degree in Fine Art / Trained in Modern Apparel Manufacturing	21
Manu06	Proprietor/Manager (Female)	HND Secretaryship/Trained in dressmaking	6
Manu07	Partnership/ Managing Director (Male)	Degree in Banking/Fashion Designer	12
Manu08	Production Planning and Coordinating officer	Degree in Marketing/ Clothing Production processes	5
Manu09	Proprietor/Manager (Male)	Shoe/Clothing Designer	18
Manu10	Proprietor/Manager (Female)	Degree in Clothing Technology	26
Manu11	Proprietor/Manager (Female)	Diploma in Secretaryship/ trained in Dressmaking	17
Manu12	Proprietor/manager (Female)	Secretary/designer/ Trained in Dressmaking/ Designing	22
Manu13	Production/Manager (Male)	Trained through Apprenticeship	15
Manu14	Administrative Manager(Male)	HND Marketing/ Clothing production processes	8
Manu15	Proprietor/Manager (Male)	HND /Fashion Designer & textile technologist	4
Manu16	Proprietor/Manager (Male)	Trained through Apprenticeship	20
Manu17	General Manager (Male)	Degree in Management/ Production Processes	8
Manu18	Cutting Room Manager (Male)	HND/ Fashion Designer	2
Manu19	General Manager (Male)	Clothing Cutter/ Trained Tailor	11
Manu20	Proprietor/Manager (Female)	HND Fashion Designer/Trained in Dressmaking	13

They had been trained initially as secretaries, a banker, an architect, managers and marketers. Five participants had degrees and higher qualifications related to clothing while the remaining five were trained through apprenticeship. Some of the participants who were not formally trained in clothing acquired the skills and knowledge informally through family trade while others obtained the skills training in clothing. Thirteen of the participants have more than 10 years of experience and the remaining seven have less than 10 year of experience. The experiences participants had obtained from other fields of study can contribute to the performance of their various companies as they all have higher form of education. Table 6.2 provides the summary information of each participant.

6.2.2 Profile of Participants from Stakeholders

Four stakeholders were selected within the Accra metropolis. The organisations were government owned with the exception of one, which was privately owned. Of the four, two of the organisations have been in existence for over 40 years and the other two for about 9 years each. Table 6.3 shows the description of the participants and their organisations. The participants interviewed were either heads of departments or coordinators in their respective organisations.

Table 6.3 Profile of Participants from the Stakeholders

Code	Organisational Activity	Years of Operation	Position of Participant	Years of Experience
StaH01	Development of standards both national and international for various functions	40	Head of Material Science Department	24
StaH02	Developing the capacity and capabilities of the clothing sector	8	Co-ordinator	8
StaH03	Business Development Services Division of Association of Ghana industries	50	Head of Business Development Services Division	9
StaH04	Textile and clothing training for dressmaker/tailors	9	Head of the Training centre	9

6.3 Results of Interviews for Clothing Manufacturers

This section presents the analysis from the interviews conducted with the clothing manufacturers. It discusses the company's history, which includes the organisational structure, company's vision and mission statement, emerging

technology and information systems, promotion and marketing of the final products. Additional topics analysed include source of size charts, variation in sizes, coding and labelling of clothing sizes, development of national size chart, clothing standards, and government policies.

6.3.1 Organisational Structure of Clothing Manufacturers

The participants were asked whether they have organisational structure in place. The result revealed the companies have different levels of organisational structure. The different organisational structures were because of the size of the companies in terms of the number of employees and their capacities. The medium and large-scale companies were well structured in terms of administration if they were compared to the micro and small-scale companies. However, some of the small-scale companies, though small were considered to be organised in terms of structure. A typical structure indicated by the small-scale companies comprises of the proprietor and one or two supervisors, and in some cases shop assistants, account officer and marketing officer. The results revealed that the majority of medium and the large-scale companies have similar structures. The structure included a managing director, managers, production manager, administrative manager, accountant/auditor, purchasing officer, heads for each department, sale/shop managers, sales/shop workers, machinist and supporting staff. Table 6.4 shows the categories of the organisational structure of the manufacturing companies.

Table 6:4 Categorisation of Companies Organisational structures

Categories	Composition of various Organisational Structures	Number of Companies
A	Managing Director, Manager, Production manager, Administrative Manager, Accountant/Auditor, Purchasing Officer, Heads of Department, Sales/ Shop managers, Shop workers, Machinist, other staff.	6
B	Proprietor/Manager, Supervisors, Machinist, Marketing officers, Accounts officer, Shop Assistants	3
C	Proprietor/Manager, Supervisors, Machinist, Shop Assistants	9
D	Proprietor/Manager, Machinist	2

6.3.2 Companies Vision and Mission Statements

The participants were asked whether their companies have vision and mission statements. The results showed that the majority of companies have vision and mission statements although not all of them have clearly written them down. Three of the participants were not specific about their vision and mission statements as they indicated that they keep changing the vision and mission statements as and when necessary depending on the trends of the market (Manu01, Manu16, Manu20). Examples of statements used to describe the companies vision and mission include; “delivering total quality our culture and excellence our passion” (Manu06), “an impact on fashion in Ghana in the sense of quality, design and style” (Manu03), “producing high quality clothing for all categories of people and for all occasion” (Manu08), “achieving excellence in style by providing excellent service for our customers” (Manu02) and “producing the best quality for all customers” (Manu11). The vision and mission statements of all the companies can however be summarised as follows; expanding the business at national and international levels, achieving excellence in style and design, maintaining standards in the industry, delivering total quality and promoting African clothing especially among Ghanaians and Africans as shown in Table 6.5.

Table 6.5 Categories of Vision and Mission Statements of Companies

No	Categories of Vision and Mission Statements	Number of Companies
1	Expanding business at the local and international levels	7
2	Achieving excellence in style and design	2
3	Maintaining standards in the industry	2
4	Promoting African clothing	2
5	Delivering total quality	4
6	*No Specific statement	3

The majority of participants indicated that their companies would like to go into export trade to promote African designs and to reach out to all who desire African clothes. It is evident from the vision and mission statements that companies want to expand beyond the Ghanaian market to other African countries and even to the international markets.

6.3.3 Technology and Information Systems

The participants were asked to express their views regarding emerging methods and technologies in the clothing sector. The majority of participants were aware of new and improved methods and new machinery that have emerged in the market to enhance and speed up production. The general view shared by the participants was that the latest models of these machines are expensive making it difficult for the small companies to invest in them. All the participants however commented that in order to be abreast with the technological advancement they need to move away from using old machinery, for instance the domestic sewing machine to modern machinery such as the industrial sewing machine, which would help them to reach their production targets as well as meet the changing demands of consumers. The following are some selected excerpts,

> We are unable to change our equipment to meet the latest models because we cannot afford them. Some of us are still using obsolete equipment in many instances, not obsolete but not really the newest. We wish that we would get more advanced in future. (Manu02)

> We have advanced from using hand sewing machines to industrial machines, which shows a sign of improvement. We have upgraded our skills on the use of new technology. (Manu03)

Some of the participants indicated that there has not been much change in the machinery they use but the methods used in applying this machinery have changed. For instance, Manu06 expressed the view that, “I have not changed my technology per se, the technology remains the same but the process to achieve the desired results is what for me has changed” and Manu20 expressed the opinion that, “I do not change my machines often but change the way I use them”.

The results revealed that there has been a major change in the use of telecommunication in the clothing industry. It was revealed that companies have access to telephones, mobile phones and internet facilities to transact effective business. It was evident that most of the clothing companies have made improvement in their communication system. Nine companies (Manu02, Manu03, Manu04, Manu05, Manu07, Manu08, Manu09, Manu11, Manu18,) have developed their own websites where they advertise and market their companies and products. The following excerpts from some of the participants show how the Internet has helped in advertising and marketing their products;

> Yes we’ve changed a lot because last year we got a website. We sell through the internet now. We advertise our products on our plastic bags, which have our website and company’s address. Customers now order items through the website and we deliver to them. (Manu04)

> We have website where we advertise and sell our products. We have made sure our website is very active. (Manu06)

Three of the participants have also improved their design skills by using computers and other designing device (Manu08, Manu12, Manu13). These participants expressed the view that they have realised the importance of designing with Computer Aided Designs (CAD) skills. They have formalised CAD training sessions for all personnel of the design department to attend formal training sessions in computer training centres. The training had equipped the employees with the right skills to perform their duties in the design units.

> We try to infuse new technology to our designs and production because we go to a lot of fashion shows. You always have to be abreast with the times and what is happening in the fashion world. With my workers, I teach them new things and allow them to attend computer training sections because they always say my designs are difficult to make so it always a challenge for my workers. (Manu09)

> What is going on in the world of fashion influence the way you work hugely because it's a growing trend in the industry and they design their clothes to matches the seasons. Participating and studying fashion trends around the world improves our concepts in designing new items for mass production. (Manu08)

The results showed that some of the companies participate in international fairs to sell their products while other participants indicated that they attend to observe the trends of the season. This demonstrates that they are constantly in touch with the clothing world. The majority of participants indicated they watch fashion programmes on the television or on the internet. Some of the participants confirmed that they conduct market survey to find out what is new or know consumer opinion. Some participants also subscribe clothing magazines and catalogues from abroad and about three participants stated they were interested in business financial reports.

> I do a lot of research on global fashion. I watch a lot from CNN, from channels on fashion programme, through magazines to check on the designs and colours of the season and based on that we also create our own movement. (Manu09)

> I try to watch whatever is going on in the international scene, interesting programmes just to keep abreast with the trends, and to know what is happening in the international scene (Manu02).

The above statements demonstrate that participants have access to information on fashion programmes on television and internet, magazines, catalogues and participate in international fairs. Some participants acknowledged that they are hardly influenced by new fashion trends because they fade off too quickly. Some of them indicated that the information influence the way they work as they inform and inspire them in their designs.

6.3.4 Marketing of Clothing Products

The results revealed that companies promote their establishment through advertising using various means. All the participants indicated that they have taken part in either trade fairs, exhibitions, catwalks and fashion shows locally or internationally or both to promote their companies and sell their products. The majority of participants specified that they have stopped attending fairs locally because they were not beneficial to their companies in terms of sales and turnover. They acknowledged that trade fairs helped position their companies in the marketplace in the early years of their business. However, most of the companies stated that they are now looking for opportunities internationally to attend fairs to market their companies and create new markets. Other promotion and advertising avenues undertaken by the participants are summarised as follows: using business card, brochures, handouts and fliers, website, advertising through the media in the form of sponsoring charities, sponsor TV presenters and other programmes described in this statement;

> We have a website, hand outs, brochures and of course one strategy is that my wife has her business card and I have my business card and wherever we go it doesn't matter whether in the market, we have our business card and in addition we wear what we produce which attracts people. (Manu06)

> We have clients requesting of our products [clothing] because they are old customers or new ones who have seen our ads on TV. We sponsor programmes and the presenters wear our clothing for TV programmes as a form of advertising our company. (Manu08)

> A couple of years ago we were sponsoring programmes like, Miss Ghana beauty contest, Mr Universe and Miss Malaika shows and this gave us the opportunity to promote our products. (Manu16)

The participants also advertised their companies by word of mouth through religious and charity organisations and other social functions. The results revealed that most of the companies find it difficult most of the time to sell their products through the wholesale and retail marketing channels. Companies were of the view that the market system in Ghana is not well structured as compared to the developed countries. A participant revealed that there are few high street shops and shopping malls to accommodate products from various companies. The limitation of Marketing Avenue for clothing products has resulted in companies not producing to the full capacities as observed from the statement made by a manufacturer:

> The general marketing system in the country is not very conducive for the fashion business. Most of the shops are not big so for them to give you small niche within the shop to display your products and sell becomes a difficulty. At least if a few more shopping malls come into the country then it might become easier to display clothes in the variety of locations so that

> when you produce clothing these shops can sell them. Then you begin to know that there is the likelihood that at the end of every working day so many products would have been sold. (Manu02)

The results also revealed that the smaller shops or boutiques are considered expensive. This is because only the affluent in society can afford clothing sold in them leaving the vast majority of Ghanaians who are below the average income level unable to patronise their products. Companies have nonetheless created their own marketing strategies to help sell their output. The participants outlined these marketing strategies such as direct sales to customers and small shops owned by individuals. All participants acknowledged that they either have their own retail and wholesale outlets, some attached to their company premises, and others situated at vantage points in the cities as indicated by some participants;

> We have three outlets in town apart from the one here, customers place order for large quantities and we discount it for them so that they can sell and make profit in other parts of the country. (Manu20)

> We sell from here and one shop located in the vicinity. Though we are renovating the place we still sell and we've initiated the direct sales move. We have salesmen and women who go out to various establishments to introduce our product. (Manu02)

> … We have a retail outlet at the Accra shopping centre. We also have two retail outlets at separate locations. We also do delivery to individual offices or homes when they place orders using the internet. (Manu08)

> We have outlets all over the country where we sell only our products both fabrics and ready-to-wear clothing. We have three shops in Accra. We supply the products according to the size of each shop. (Manu18)

Participants who export their goods explained that for the international market they have retailers who buy from them and sell. Some of the participants sell through the Internet and others sell when they attend trade shows and exhibitions. It became clear from the responses of the participants that the internal market for the clothing business needs restructuring and positioning. This will enable manufacturers to produce in quantity and of quality to meet the demands of the consumers at a moderate and affordable price.

6.3.5 Sources of Size Charts

Participants were asked to comment on the sizing system they use in producing ready-to-wear clothing. The results clearly indicate that there is no official national sizing system that has been developed for the Ghanaian clothing market as at the time of data collection. Manufacturers have therefore adopted, and/ or modified, or

created their own size charts from International Standard (ISO), British Standard, American Standard, and from other sources because of the non-existence of a Ghanaian size chart. Table 6.4 shows the various sources of size charts used by the companies interviewed.

Table 6.6 Various Standards adopted by Company Companies

Standards use by Companies	Total Number of Companies	
	Using Original Size Chart	Using Modified Size Chart
American Standard	4	1
British Standard	-	4
International Standard (ISO)	1	4
American/ British standards	-	4
Africa/America/Commercial	1	-
Company's own size chart	-	2

Manufacturers who have adopted the International Standard (ISO) expressed that they have altered the measurements to suit the Ghanaian market (Manu02, Manu04, Manu07, Manu08). Only one participant (Manu01) has not altered the standard because she was confident that it was suitable and gives good fit to the Ghanaian woman. The other participants were of the view that the International Standard guided them in developing a suitable standard for their clothing production as the following quotes illustrate,

> …we were using the International standard but we realised that sometimes we needed to make few changes to them. We have come out with our own patterns, which will fit anyone with an African body because we have taken care of the curvatures. (Manu04)

> We used the international sizing to be able to come out with our own. We have graded them in such a way that people who have large bodies can be catered for. (Manu07)

> I went through training and we were given the International Standard sizes in body measurements and the ease allowances for the various part of the body and then depending on the style you take or add. What I realised was that the International Standards sizes we were given actually fits so there was no need for any adjustments. (Manu01)

> We stick strictly to the international acceptable sizing for the smaller sizes because most of the people do not conform to the International Standard. We have taken many body measurements from clients and modified the International Standard specification to suit the rest of Ghanaian woman. (Manu02)

The above excerpts show that these companies used the International Standard as the baseline in developing size chart for their companies use. All participants who have adopted the ISO standard with the exception of one indicated that body measurements for each size were adjusted to suit the shape of the Ghanaian woman. The participant who did not alter the measurements confirmed it was suitable for the market.

Companies who have adopted the American Standard indicated that there are similarities between the body shape of a Ghanaian woman and that of the American. They explained further that the American body conforms more to the kind of the Ghanaian than any other body shapes (Manu03, Manu05, Manu09, and Manu11) as indicated in the following excerpts,

> When it comes to the Ghanaian market what we have done for the US market works here as well because they are about the same size. They are heavy and busty as we are here so it works here. Customers walk in and buy the clothing we have in our show room and they fit into them. (Manu05)

> We use the American sizing and not the British sizing. We do not have a lot of slim Ghanaian women customers. If the person is in either school or fresh from school then it is possible to use the British so most of our sizes are for women who are of big sizes. (Manu09)

> I use more of the American. I think the British and American size charts are different. I focus on the American so I don't get confused. I don't use two size charts I just stick to one. (MANU11)

One of the participants indicated that her company has modified the dimensions of the American standard by comparing it with a database of body measurements the company has compiled over the years to suit customers.

> For the local market I use the American sizing because it conformed more to our kind of fuller figure but the British sizing is smaller because majority of them really like looking slimmer. I did some adjustments by using the database of body measurements, compared with the American standard, and came out with something that would suit the customers. (Manu03)

Other companies have adopted the British standard but they had to adjust it by comparing with the individual measurements they have compiled (Manu10, Manu13, Manu14, Manu15) as the three following statements illustrate;

> I used the British size chart and adjusted them an inch there and an inch here to fit the average Ghanaian size. It worked in fact a few of my friends told me my ready-to-wear fitted better than my cut-to-fit. (Manu06)

> The one that is closer to the Ghanaian sizes is that of the British sizing. The body measurements use for their size 12 are not different from what we use, except that we only have to portray it in a way to be able to fit our customers. (Manu13).

> We usually use the British size charts because we found out that Ghanaians can be more liken to British than to the Americans. The Americans are more bulky and generally larger than we are so we go according to British chart. (Manu14)

This group indicated that the British size chart is closer to the Ghanaian figure and fit well when used for ready-to-wear clothing. They however indicated that they altered it to suit their customers. Some (4) of the participants indicated that they compared the size charts from British and America Standards with body measurements they have taken from a cross section of Ghanaians and developed suitable ones for the Ghanaian market (Manu10, Manu12, Manu17, Manu18).

> We came out with our own size chart as results of taking measurements from the individual customers and compared with UK and U.S size charts and ours fall between the two. We

> realised that the measurements will be too small when we use the UK size and too big for the US. We used the two charts as a guide and developed a more suitable one. (Manu18)

> I took the British and the American size charts and did plus or minus. I put the figures together with the measurements taken from clients and came out with my own sizes. Now I have my own sizes. (Manu10)

Another participant indicated that her company solely uses the African America size chart and commercial patterns (Manu19). The remaining companies indicated that they have developed their own size charts based on the body measurements they have taken from their client over a period of time (Manu16, Manu20).

> I didn't use the foreign sizing chart because they were not suitable for my clients except in some few cases when mine have some features similar to the European kind of figure but even with that they fit the waist without fitting the hip. I actually compiled body measurements from my customers and used them to develop one. (Manu16)

Twelve participants expressed that they have not changed the size charts the companies have been using. Three participants however indicated that the continuous use of a particular size chart by their companies was due to the fact that they do not want to get confused over the differences in various size charts. They acknowledged that changing from one standard to the other could create many fit problems. From the results, the majority of companies have developed their own sizes by using the International standard (ISO), American standard and the British standard as the base. One of the participant acknowledged that the company changed their size charts when it realised the sizes were too small, by stepping up the sizes, but maintained the chart without changing or developing a new one therefore resulting in size 10 becoming size 12.

6.3.6 Variations in Sizes

The results revealed that there are great variations in sizes among the various manufacturers. Participants identified four major factors that caused variations in sizes: using different size charts, freehand cutting, manual cutting and human error. The use of different size charts was identified as the major factor that brings variation in sizes. Participants attributed this to the non-uniform or non-standardised measurements used by the clothing industry. They acknowledged that manufacturers use size charts from different countries. They explained the action behind their choice earlier in Section 6.2. The body measurements that are used for developing the various size charts are not the same and using them yields a lot of differences in one size as indicated in the statement;

> Yes, the size 12 in the US is different from the size 12 in UK because people in UK as compared to those in the US are smaller. Every country has different sizes and it depend on which one you are using. (Manu05)

Some of the participants confirmed that variations occur during fabric cutting process. The majority of participants acknowledged that different cutting methods may produce differences in a particular clothing size thereby resulting in variations of same size among manufacturers who use the same size chart. They acknowledged that variations in sizes occur when cutting is not done in a commercial way but rather using manual cutting method. All the companies with the exception of the two large scale companies do not have cutting machines and fabric cutting are carried out using traditional methods as commented in these excerpts;

> Variation happens because we don't cut together like what happens in the industries in the developed world. They can make 2000 pieces of one shirt less done a day because they cut the piled fabrics using cutting machine but here majority of manufacturers do not have the cutting machine as such we cut one at a time, so obviously you will have problems and it is like one fabric one cut so you won't get the same as much as you try though they may be close (Manu12)

> The way we cut and sew may result in some disparity in the sizes. It is not always corrected. We intentionally allow that sometimes because of the kind of market we have. We usually provide for our shops. We do not have wholesalers coming in and making an order. For instance if we want shirts of a particular size based on an order then we sew to the specification but if we are sewing for our shops we allow for the disparity because we know there are different sizes and they may be good for some people. (Manu14)

The majority of participants indicated that variations in sizes could also occur during the actual sewing period. Participants indicated that some of the variations that occur could be attributed to the negligence of some employees who are supposed to use precise instructions for production of the various sizes and supervisors who are responsible for quality control and size regulations. The participants made it clear that the level of understanding of sizing issues by various employees may also contribute to the variations in same size especially when adding ease allowance to various sizes as the following excerpts illustrate,

> When you cut fabrics, they should be in the same size and must stitch a certain measurement whether you are stitching half or 5/8 of an inch to get your correct measurements but when the right increment is not used variations can occur. (Manu10)

From the above excerpt, there is evidence that human error can occur during cutting, adding ease allowance and stitching and these accounts for variations in the same sizes. Poor supervision was one of the factors participants identified as contributing to the variations during sewing, as participants stated that good supervision would help detect disparity between sizes earlier before clothing are

finished. A few of the participants also used free hand cutting method instead of flat patterns. Participants accepted that this method has the highest risk of creating variations in same size. One participant stated that even though she uses free hand cutting she still uses the standard measurements but acknowledged variation happens because they do not work with patterns.

> I do free hand cutting. I have British and the American measurements so we know what the measurements are and we use them accordingly. (Manu12)

Most of the participants however added that they ensure that the variations of sizes are limited before the finished clothing. This is carried out by the supervisors who do regular check at every level of production to make sure the employees stick to measurements and ease allowances needed to be used for each size. It was revealed that the supervisors in charge of production go round ensuring that from the onset the right thing is done and it is completed as stated in the following excerpts;

> We have the quality control manager who after everything checks the measurements and finishing. Patterns are ready made if we say we want a large size the person knows what you are talking about and then the machinists have the measurement that is used for each size. Therefore, if you say medium they know the measurements they have to use. They check according to the measurements and then the finished clothing. (Manu04)

> The production supervisors check products before they come to the production planning officer for verification and then it moves on to the finishing. Another check is done after finishing before it goes to the sale officers who do the final check. If there is an oversight and a problem is detected at the last check we recall the item and it is explained to every team member why the item has to be recalled so that the same mistake is not repeated. Actually before it reaches the shop it is approved by a lot of departments or team members and the sales officers. (Manu08)

One of the participants however specified that her company does not correct clothing which are not accurate in the size specification. This is done to cater for some group of people who do not have the normal size, for instance, those whose size is neither 12 nor 14 but may be 13, which by standard do not exist.

6.3.7 Vital Body Measurements

Participants were asked about the body dimensions they consider vital in the production of women clothing. The majority of the participants indicated that the bust and the hip are the most vital measurements. They stressed the need for manufacturers to consider these measurements when producing women's clothing as the following statements illustrate;

> The bust and the hip are very important. In certain sizes especially size 14 upward if you don't put in breast darts and it is just the normal front and back darts for some people it raises in front. I find that physical part of the body seriously. Some people also have

> extremely large hip certainly these figures need consideration. In everything, I will say that the bust is important. (Manu01)

> I take the bust, waist, hip and shoulder to waist, the across front and across back, if you use the standard measurements here maybe they are just an inch from the back but here people are busty so the difference between the front and the back may be between 3 or 4 inches so if you don't get rid of it then you get this balloon at the back. For every individual it is different as much as you put people in sizes they are different. It is more than pick of the rack because that one is standard measurements. (Manu12)

> The bust, waist, hip and the across back it has to fall at the across back properly. (Manu11)

Some of the manufacturers indicated that aside the bust, waist and hip the following parts are also considered important; the upper hip and the lower hip, the shoulders to the waist, the front and the back across the shoulders, sleeve length and bicep.

6.3.8 Coding and Labelling of Clothing Sizes

Coding in the clothing industry has been an issue of importance (Refer to Chapter 2 Section 2.6.2). Clothing are coded for easy identification. The result revealed that the manufacturers code their clothing using numerical or alpha numerical (Table 6.7). Seven of the companies use the numerical system, 4 of the companies code their clothing using both numerical and alpha numerical and 7 companies use only alpha numerical. The sizes in the labels appeared either in the letter or in numbers. Companies who use alpha numerical system code the clothing ranging from small (S), medium (M), large (L), extra- large (XL) and extra extra-large (XXL). A few of the companies codes their clothing from Too extra small (TXS) or extra small (XS) to extra extra extra-large (XXXL). Companies who use numerical codes range their clothing from size 6 with intervals of 2 between each size. A summary of the coding system used by the various companies is presented in Table 6.7

Table 6.7 Coding Systems used by Clothing Companies

Company Code	Type of coding	Size Range (Numerical)	Size Range (Alpha-numerical)
Manu01	Numerical	6-20	-
Manu02	Numerical	10-18	-

Manu03	Numerical/Alpha Numerical	6-24	XS-XXL
Manu04	Alpha numerical	-	XXS- XXXL
Manu05	Numerical	6-30	-
Manu06	Numerical	10-26	-
Manu07	Alpha Numerical	-	L-XXXL
Manu08	Numerical/Alpha Numerical	12-24	L-XXL
Manu09	Numerical/Alpha Numerical	10-18	S-XL
Manu10	Numerical	10-28	-
Manu11	Numerical	8-26	-
Manu12	Numerical/Alpha Numerical	10-26	S-XXL
Manu13	Numerical	10-30	-
Manu14	Alpha Numerical	-	S-XXL
Manu15	Numerical	8-18	-
Manu16	Alpha Numerical	-	S-XXL
Manu17	Numerical	8-24	
Manu18	Alpha Numerical	-	S-XXL
Manu19	Numerical/Alpha Numerical	10-24	M-XXXL
Manu20	Alpha Numerical	-	S-XXL

(Extra Extra Small-XXS, Extra Small-XS, Small-S, Medium-M, Large -L, Extra-X, Extra Extra Large-XXL)

The results revealed that most of the companies who code using letters range the sizes from small to extra (extra) large but some have gone beyond and above this range by adding extra small and three extra-large. Most of the manufacturers who use numerical have sizes ranging from size 10 to size 26. Some others range their sizes from size 6 to size 30. It is evident that manufacturers who use the alpha numerical method of coding produce more loosely or semi loose fitted clothing than those who use the numerical system. Table 6.7 also shows the range of sizes used by the various companies. Some of the companies have wider range of sizes than others and this show that need for a wider range of sizes on a Ghanaian size chart. The size charts were considered proprietary for the companies as such details of the measurements were not available for the researcher.

6.3.9 Development of National Sizing System

Participants were asked whether there was the need for a national size chart to be developed. The majority of participants expressed that the development of size chart is crucial to the development of the Ghanaian clothing manufacturing industry as explained in the following statements;

> Yes I think it is important because we need a national size chart. We always have problems with the European ones we are using except for instances where the people going to wear the clothing are models or people who keep slim figures then it will fit. (Manu15)

> We do, we definitely do, and we really have to get it. The working class I call them the corporate world are increasing so there is the need for us to have sizes so that at least when the person walks in a shop at any time she will be able to pick any dress that will fit. (Manu10)
>
> Yes, Ghanaian sizes are almost the same with the America. If a person says I wear large it can either be a UK large or US large then that is where the problem starts from and the person will start complaining. Because of this confusion and problems associated with using other size chart we should have size charts as Ghanaians. (Manu17)
>
> If we are able to standardize our sizes then customers will be able to choose sizes just like the Europeans. This will help them order using the internet or pick from any retail shop without having fit problems (Manu04)

The excerpts above show that the participants are of the view that it is important for the country to have a size chart just as the Europeans, Americans, and Asians and elsewhere in the world. The participants expressed that the size charts adopted from other countries are not always suitable for the Ghanaian market because they need modifications. Using Ghanaian size chart would help the industry to market their product by using internet marketing, wholesale and retail outlets to meet the clothing needs of Ghanaian women.

One participant expressed that "it would have been much better and easier for the country to have a sizing system instead of adding or subtracting from other size charts and making adjustments to suit customers" (Manu13). Another also indicated "it is very difficult to get a dress that will fit well. Most of the time clothing needs to be adjusted before it can fit the wearer" (Manu18). While majority of participants support the development of a size chart, three participants opposed to the idea of developing a size chart because they are of the opinion that the adopted ones are suitable for the local market. The following excerpts revealed the perception of these participants:

> I do not think that we can actually have a size chart for Ghanaians because the shapes are so many and different. People are wide on the hip as you look at them on the frontal view, others are wide from behind as you look at them from the side view and so there are differences in the way in which things [clothing] would have to be shaped. If you want to look at that generally, the main issue is that we would probably end up with smaller waist heavier hips and moderate to heavy bust. (Manu02)
>
> When it comes to the Ghanaian market what we've done [produced] for the US market works here as well because they are about the same size they are heavy, busty, they are a big so it works. When people walk in to the shop they pick clothing that we have sewn and without complaining and they are able to fit them. (Manu05)
>
> I know some people are advocating for that and some have tried that but personally I would say no because people travel out of this country a lot and they buy goods outside. How do they fit into clothes? We have foreigners coming here to buy clothes so if we are going to have our own special measurements and use that to sew we are looking at exporting our goods, how would this fit into that. (Manu01)

The above excerpts revealed the reasons why a few of the participants are of the view that developing a Ghanaian size chart is not necessary. The reason given by one of the participants is the vast variability in the body shapes of the women in Ghana. He was of the view that it will not be practicable to use such a size chart. He however expressed that there should be a system in place that can help make the use of the adopted size charts practicable as creating the size chart will not be enough to cover majority of the Ghanaian women. The other two participants were also thinking of meeting the needs of other markets order than the local market. One of the participants who indicated the need for a size chart, stated that the individual companies have their own small target group to meet in the country so what the company has developed may work perfectly but for a manufacturer to meet the bigger market there is the need for a size chart that will be practicable to all potential consumers.

> … that is if you want to meet the bigger market then you have to follow the sizes that are standard, but then if you are thinking of only your market then you can think of creating your own sizes. It however depends on you if you are able to make it in the bigger picture then you can create your own measurements. Because your medium may be a perfect medium and people know you for that size and that is where you can create your own measurements. (Manu09)

The results also revealed that some participants indicated that it would be a laudable idea for a research to be carried out in order to develop a size chart. They however acknowledged that it is a difficult task to develop a viable chart in a short period. They were of the view that new things are always difficult to start with but may work perfectly well when it is widely accepted due to it suitability and practicability. The views of these manufacturers are expressed in the following excerpts:

> It is, it will help a great deal but a lot of work will have to go into it. You have to find a cross section of people from all the regions. Because now we are into ready-to-wear, I have measurements of a cross section of people I have compiled to come out with sizes. We then compare my typical sizes with maybe size 10, 12 and 14 from other sources then we look at how similar they are and then develop our own clothing sizes. I think it can work but we have to work on it carefully. (Manu06)

> It will be a good idea for somebody to go into that research and come up with something locally because I have not seen any local chart made by anybody in Ghana. I do not know if somebody is working on it I have no idea. (Manu11)

> I believe anything can be tried. I am sure those in abroad started this way, they did the same thing, and it is helping them so it is a good idea. It will probably make life easier for all of us you just sew it and hang it instead of people putting pressure on us. One needs to go and buy from the shop. It is just that new things are difficult to start but then when you start it come to stay when people understand it should be of help. (Manu12)

The results indicated that manufacturers generally support clothing size research towards the development of a size chart for the Ghanaian clothing manufacturing companies. Nonetheless they have accepted the fact that it can be time consuming and difficult to start developing size charts as well as convincing clothing manufacturers of its benefits. They are of the opinion that the clothing manufacturers and the public need to be educated on sizing issues in order to make the acceptability of the developed size chart easier.

6.3.10 Clothing Standards and Government Policies

Results revealed that some of participants were not aware of any national clothing standards that are used to regulate the activities of the clothing industry. The majority of participants did however indicate that the clothing associations of which they are members guide and educate them on issues concerning acceptable standard of products. They expressed that none of these associations has the mandate to monitor the operations of their companies. It is evident from the results that the stakeholders work with state agencies that have been mandated to monitor the standards of the clothing industry as explained in the following excerpt:

> The association works with other state agencies. Recently I received a letter from the Standard Board that they are coming up with Standards for the clothing sector and they are yet to do an inauguration. They have not done that yet because I understand it quite expensive. (Manu01)

The results revealed that some of the clothing associations in a way act as advocators by negotiating tax relief for members, educating them on important issues such as registering and licensing of company, taxes, trade practices, writing business plans, organising seminars and workshops to enhance their knowledge and skills. It was revealed that they create industrial alertness, to promote made-in-Ghana goods, educate members on using standards prescribed by Ghana Standard Board and link members to international organisation as stated in the following excerpt:

> AGI have been advocating for 'consume made-in-Ghana products' to prevent Ghana been used as dumping ground for shoddy goods that are coming in from all over the world. It sensitizes members on industrial alertness and produce to meet standards. Members are encouraged to use standards sets by Ghana Standards Board in their production. Of course, it has connections with counterpart institutions and association outside Ghana. The association organises trade fairs with neighbouring countries and members are able to attend and exhibit their wares and do some business. (Manu07)

> They help a lot because I got help from USAID EMEX. They were contracted by USAID to help with the recent up and coming clothing manufacturers. We have had many help from them such as training, sponsorship for exhibition and conferences. It has been very helpful. (Manu05)

Some participants indicated that the standard of their products are only checked under programmes initiated by the government and other foreign agencies to ensure they meet the requirements for export. The results revealed that companies who export under the African Opportunity Act (AGOA) scheme, an act passed by the US government to help African countries access the duty free and quota free US market, qualify when they meet certain standards. The majority of participants are of the view that the industry can grow if there are standards that are set to check the activity of clothing companies at the local and national levels. It is evident from the results that the future of the clothing industry may depend largely on external government policies. They also indicated that the clothing industry in Ghana may do well if the government intervenes and give them aid in a form of financial assistance, tax relief, free import tax, receiving loans from the banks with minimum interest and regulating trade liberalisation.

> Many companies are trying to source for funds to help in their production but it has become difficult for them to pay all the tariffs. It is going to take some interventions from the government definitely to subsidise certain things, get fabric coming into the country much more affordable, and provide training facilities and sustainability schemes before we can see some progress in the industry. (Manu02)

> The government should regulate the inflow of rejected and second hand clothing into the country, bring together the small businesses under one umbrella and give the necessary financial help to the clothing companies. There is also the need for government to bring in machines in subsidised prices to enable them compete globally just like other countries. (Manu17)

> I wish we receive some push from somewhere because to be able to create a niche in the international and local market you need a lot of money. Many local companies lack funds to produce in large quantities. There is the need for a push from the government. (Manu09)

> As far as the government is concerned, we need free zones so that people can import fabrics and accessories for production because the fabrics in the market are not making us competitive at all. The problem is some business cannot go free zone because the requirements are stringent. It is important that the government arrange for the small-scale companies who do not qualify to come together and import fabrics. (Manu04)

One manufacturer indicated that there is the need for government intervention to strengthen the industry, support to the textile industry and regulate the inflows of foreign goods competing with the local products. The participant was of the view that the cost of clothing will be less when the prices of fabrics produced locally by the textile industry are reduced.

Results revealed that the majority of participants point out that the future of the industry depend on government policies on taxes and tariffs imposed on importation of raw materials for production, the revamping of the textile industry,

financial support from government in the form of sourcing bank loans and regulating trade liberalisation. One of the participants stated that, “the industry is very old one but unfortunately the clothing industry is not assisted and helped at all.” (Manu13). Another participant indicated that “If I am buying the fabric and it is very expensive I would stop buying. If the textile industry is supported by the government it will cut down the cost of production and at the same time offer jobs”. (Manu20)

6.3.11 Clothing Industry in Ghana

Participants were asked to express their views on the state of the Ghanaian clothing industry. Most of them expressed that the industry has improved over the years and doing well especially among the African clothes despite the numerous problems. One of the participants stated that, “It is growing and people are accepting the African fashion” (Manu09). Some manufacturers indicated that the industry has become more competitive because it is filled up with competitors who have different and concrete ideas as the following excerpts show;

> We have a bright future because Ghana is known to be one of the countries that are good at what we do especially in clothing. When you travel outside the country, we hear people say they want African clothes not any one but they want made-in-Ghana so it tells you that the local manufacturers are doing their best to put us up there. It is competitive, people are coming up with ideas and it is getting better and better so it is good. (Manu11)
> Generally manufacturers are doing well and becoming more creative because you pass by shops and see interesting things [clothing] and I think we are becoming more and more innovative in what we do.(Manu01)
>
> I think we are moving forward, things are improving yes because I go round and even things [clothing] you see on the street or hanged on the streets are well made though some are not well made so I think there is room for improvement. (Manu03)

The results revealed that the majority of participants appreciated the fact that the industry has grown in terms of size, which means more people are investing in the industry, quality of products have improved and people have become more creative and the finishing improved.

The results also suggest that external and internal forces hamper the growth of the clothing industry. Despite these positive observations made by some of the participants, others enumerated some problems that have hampered the progress of the industry and what need to be done to help the industry. One of the participants stated that there is still a problem with the structure of the some clothing companies since most of them focus on the design aspect rather than production, marketing and distribution. The participant made this statement,

> "I think that many people are trying to be very innovative maybe they should look more at the marketing aspect specifically, what exactly the market wants and how they can provide that. I also feel that the industry is ill prepared". (Manu02)

The majority of participants were of the view that jobs should be kept in the country in order for the industry to grow. They confirmed that contracts have been taken from local manufacturers and given to foreign companies because of low level of production depriving the local manufacturers of work. Some participants identified education and training of individuals for the industry as an area that needs attention. They suggested that the educational policies should be restructured to address the need of the industry. There is the need for the right training centres, train individuals and to bridge the gap between the industry and colleges and universities. They were of the view that more training centres should be set up to train people so that they can work in fashion houses to aid the industry growth.

> The clothing industry in Ghana has some problems. People here don't see the need to progress in their education if you want to go into fashion those who proceed and progress in their education too do not see the need to learn the rudiments of sewing and because of that there is a gap between the two. (Manu05)

Results revealed that the main external force was competition from giant clothing industry from abroad. This is the underlying factor of the inflows of cheaper foreign goods. The participants indicated that the industry cannot compete with these foreign superpower companies who produce similar products at a cheaper price and are affordable unlike the clothing produced by the local market. They indicated that textile products are expensive and by the time clothing is finished the total cost of production will be more than the price of imported ready-to-wear clothing. The production capacity of a Ghanaian company cannot be compared with that of the giant companies abroad as explained by the following excerpts;

> When for instance the Chinese are producing one million shirts a day in one factory we can only produce ten and so you can't compete. We must create competitiveness in a manner for instance we have the ECOWAS [Economic community of West Africa countries] market space, first of all our own domestic market space which we must address, if we seriously want to clothe Ghanaians you would not even be thinking about exporting, then the ECOWAS sub-region or if you go into Nigeria alone just one country you should be able to make the money. (Manu07)

> I feel that if some money is pump into the clothing sector at least we might be able to stay in the niche market operation and have very successful designers in the operation because there is a market in Ghana, in West Africa, in Africa as a whole. There is a market for our clothes generally by other people as well who are not necessarily Ghanaian and so we need to look at those where our strength are, afro centric design and not to compete making TM Lewin kind of shirts. (Manu02)

Some of the participants argued that the industry should be able to identify the areas they are good at and concentrate on them instead of trying to compete with the world super companies. They expressed that manufacturers should know what they are good at and concentrate on those areas, whether to be manufacturing destination, where people have the right work ethic to adopt themselves in manufacturing or a design destination where people just design, export their designs and get it produce elsewhere.

6.4 Results of Interviews for Stakeholders

This section outlines the analysis from the interview conducted for the stakeholders. It was revealed that each of the stakeholders play a very important role in the clothing industry. One stakeholder indicated that his organisation act as an advocator for the industries in Ghana which include the textiles and clothing industry. The stakeholder stated that its core service of the organisation is to act as policy advocator between the industries and the government. Services they offer include business services such as writing business plans, market research feasibility studies and business counselling. The stakeholder also organises programmes such as exhibitions and trade fairs, workshops and seminars to help its members, as indicated in the following excerpts;

> In terms of our services, our core service is policy advocacy that is our major service and that is what most companies expect and for so many years that is what our organisation basically is doing, policy advocacy, lobbying government and policy makers to come out with policies that have positive impact on individual company's development. (STH03)

Another stakeholder also indicated that her organisation oversee the training aspect of the clothing industry. It liaises with the clothing associations to find out about the programmes they offer their members and the impact it has on their operations. Her organisation offers training programmes to improve upon the performance and the quality of the clothing produced by these manufacturers. They train members on the use of new equipment and machines.

> The main purpose is to improve upon the skills of those who are already in the industry, improve their creative skills and finishing. As for creativity we know they are creative but the finishing aspect needs to be improved to enable them compete well in the global market. (STH04)

One of the stakeholders stated that his organisation deals with the standards of goods and services. The standard of products is checked by inspecting, testing and finally granting certification to manufacturers or importers. The stakeholder organises training programme to create awareness of standards and how the

manufacturers can comply with these standards, as being explained in the following statement;

> We have the department within the board the quality assurance under which there is an inspectorate department that visit these factories and look at the quality system, management system, and quality controls. What is done is that they bring samples, which are analysed, and when they conform to the national standard that we are using we give them a mark of conformity to assure the consumers that the product meets the local standard. (STH01)

Another stakeholder expressed that her organisation develops the capacity and capabilities of the clothing companies and create jobs by establishing factories. This they have ensured by setting up training centre in Accra to train operators that would work in these factories.

> We develop the capacity and capabilities of the clothing industry to be able to produce high quality clothing for exports especially to the US and the European market, taking advantage of AGOA. Our objectives are to create jobs, establish about fifty factories and to be able to generate foreign exchange for the Ghanaian economy. We are trying to identify existing Ghanaian old factories, give them the support that would also encourage them or enable them to produce. (STH02)

From the results, it is evident that the performance of the stakeholders on the role they play in the clothing industry can have positive effect on the clothing industry. The stakeholders expressed that when these roles are executed well the clothing industry will grow regardless of the stiff competition and challenges it faces. The standard and operations of the clothing manufacturing may depend on the performance of these organisations.

6.4.1 Development of National Sizing System

The development of a national sizing system was of great concern to many manufacturers as revealed in the Section 6.3.9. The analysis from the stakeholders suggest that there has been no official national anthropometric body measurements survey conducted in the country, as a result there is no statutory size charts used by the clothing industry. They indicated that it is important for the country to develop its own sizing system in order to ensure the growth of the clothing industry. One of the stakeholders who represented an organisation that is responsible for standards in the country acknowledged that although there has not been a sizing system developed based on the Ghanaian women, he however confirmed that the Board has adopted the International Standard as a guide for the clothing industry. He followed this claim by explaining that his establishment in recent days has been in constant touch with the various clothing associations in this respect. It was revealed that the organisation has plans to conduct a national

survey on body measurements to develop a sizing system for the country as stated in the following excerpts;

> "It is our hope that by the second quarter of the year (2009) we will put strategy in place where we can have it through the tertiary institutions. Some members of the technical committee of the textile and clothing from the tertiary institutions would also help us develop this data on measurements". (STH01)

Results showed that the other stakeholders also shared the same view as STH01 and with the majority of the manufacturers (Section 6.6) about the development of sizing system. The stakeholders expressed that the clothing industry will develop if only the size charts relate well to the body shape of majority of Ghanaians. The stakeholders stated the importance of a sizing system as the following excerpts demonstrate;

> I think the issue of sizing of clothing cannot be overemphasized. We all know it makes things easier, facilitates trade and the important thing is that people may be made aware of how sizing of clothing help everybody. It helps you to buy for somebody, it helps people to access whatever they want so the awareness must be created more and more about the importance of sizing because we have down played sizing in our clothing industry over the years and as a developing country, we need to work very hard to have a sizing system. (STH03)

> … I think that we need a national sizing system and once we get a national sizing system people should be educated about it, have the manufacturers to start implementing it so that you can walk into a shop, and pick a garment. (STH04)

> … the standard sizing from other countries are not okay for most individuals, as you are aware some part may be alright and other not but taking our figure type into consideration I think that the American type they use will be better since Ghanaian women have a bigger back side than the British. (STH03)

Even though the stakeholders acknowledged the value of the development of a national size chart, they recognised the difficulty of that exercise. One stakeholder stated that, "I think when it comes to sizing it is easier to handle with kids than adult that is my opinion because the average woman by the time she is 25 years the anatomy changes and then it becomes very difficult at one time to be able to predict how the person will look like (STH01). The stakeholders also indicated that the development of a sizing system may need special equipment, expertise, financial obligation and cooperation of the Ghanaian population. They indicated that much would go into a national body exercise than one can envisage so it has to be handled professionally in order to obtain a practicable and workable one. A stakeholder stated that, "I think we can develop our own sizing but we need the proper equipment which will helps us to go through that" (STH02).

The stakeholders were of the view that the sizing system should make clothing easy to assess and cheaper because they would be mass produced. One of the

stakeholders expressed this view, “In the local industry most of the clothing are customised and it is expensive. If we come out with a national sizing system and everybody knows that just as I can pick a size when I walk into a second hand dealer, I can also walk to this shop and get my size so that I do not have to spend time to obtain it customised for me. I think that one will help’’ (STH03)

6.4.2 Clothing Standards and Government Policies

Contrary to the views of the clothing manufacturers on standards, one of the stakeholders whose organisation is responsible for setting standards indicated that about there are about 100 Ghana textiles and clothing standards. Seven of these standards deal with size designation and measurement, which includes clothing sizing (ISO: 8559:1989) to help the clothing industry come out with a uniformed sizing (See chapter 3).

The stakeholder expressed that even though this standard on sizing has been adopted they are not well known to majority of the clothing manufacturers. He further indicated that his organisation has developed a code of practice in addition to the standards adopted for the clothing industry, which would be published. The code of practice outlines some guidelines a manufacturer needs to follow during production. He however admitted that they have started creating awareness through education as expressed in the following excerpt:

> Now we are organising workshops. We have written to the tertiary institutions, organisations, manufacturers and then Association of Ghana Industries (AGI) where members are part of the group that these are the various standards that can enhance their work. (STH01)

Results revealed that even though there are some standards there are no policies set by the government to make it mandatory. He admitted that for clothing manufacturers to conform to the standards set by the country there should be a policy that will re-enforce it. The stakeholder emphasised that when a standard is not backed by a policy it is not mandatory but optional. He further added that these policies should be enforced through law after educating the public as explained in the following statements;

> On policy I think as a country, what we need at this time is mandatory kind of policy. Whether you are a small-scale or large-scale if the policy is mandatory, that this is what you have to do once you are producing garment everybody will follow. In that case Standards Board will be in the position bring in more standards. We should not lose sight of the fact that there is a cost issue services since what we offer are not free. (STH01)

It is evident that there is the need for re-enforcement of these policies on clothing manufacturers to ensure that their products meet the standard required. These policies would serve as checks for the companies either from the small or large-scale for export as well as for the local market. Results revealed that there are a number of policies implemented by the government, which are not in favour of the local clothing manufacturers. These policies have had adverse effect on the clothing industry. It is evident that two main operations; trade liberalisation which has increased the influx of wholesale importation and second hand clothing coming into the country have affected the local industry. Taxes introduced by the government such as corporate tax, and VAT payment, were identified by some of the stakeholders as policies that affect the clothing industry as explained in the following excerpt;

> … trade liberalisation policy as a whole has not favoured local industrial development. I am not saying that the policy is not good. We do not have a choice anyway than to liberalise but we think the approach and the implementation of the liberalisation policy could be better because we have wholesale importation of all kinds of products into Ghana and one of the worse affected sector is the garment and textile sector. Another area is the second-hand clothing, which is seriously affecting members businesses because they are so cheap and the ordinary Ghanaian can afford them. The average person buying a locally manufactured garment think it is expensive will rather go in for second-hand clothing, which may serve the purpose. (STH03)

One of the stakeholders indicated that his organisation liaises frequently with the government to negotiate and make policy recommendations. He acknowledged that they cannot oppose the importation of the products because of trade liberalisation but can draw the government's attention to the fact that even though the country is a member of the World Trade Organisation (WTO) there is a provision in the WTO regulations, which protect companies from developing countries such as Ghana. They advocate that the implementation of WTO regulations should be implemented in a way that will give protection to the local industries.

Some of the taxes introduced by the government such as corporate tax, and VAT payment were identified as some of the policies that affect the clothing industry. The stakeholder explained that his organisation has been able to help reduce corporate tax which used to be about 32.5% and now it has come down to 25% through negotiations with the government. He added that they employed international consultants to look at the tax system and based on the recommendations made they strongly advocated for reduction which has now been reduced to 25%. One of the stakeholders added that under the Free Zones

Board all products that are imported are exempted from tax, in the same way when you are shipping outside under AGOA manufacturers are exempted from duties or taxes but admitted that this offer covers only those who are under the scheme.

6.4.3 Perception of the Clothing Industry

Results revealed that there are many challenges facing the clothing industry. Some of the challenges outlined by the stakeholders include capital, skills, efficiency, modern machinery and expertise. It was revealed that the clothing industry in Ghana is not competitive because of the influx of similar but cheaper products from other countries. One of the stakeholders indicated that the prices in the market are not competitive even though they have "very good and beautiful products" as the three following statements illustrate;

> It is challenging. Let me put it that way it is challenging because some time ago we were very competitive but today it is very challenging because of the might of the some industrial countries especially China. The Chinese products are so cheap because they have the technology and labour is very cheap. Ghana may also say yes we have cheap labour but then if you look at productivity wise we are not cheap because the kind of volumes someone working in China will produce will be much high than what the typical Ghanaian can produce when giving the same hours. (STH03)

> The challenges have always been there. Capital is the number one challenge, efficiency, they lack the skills because when you look at the mass production set up you realise that the people [manufacturers] cannot be compete because of their low efficiency level. (STH04)

> The problem too for the micro business is the financing. Garment industry is capital intensive so you find it difficult to get the equipment that would do the job. We haven't really moved any further because at some places the machines are still lying idle and are not been used because the consultants who came to install and train people have left and there are no competent people to operate them. (STH02)

From the above excerpts, one can deduce that local industry is going through difficulties due to the competition it faces with global exporters like China, Thailand and Turkey. The stakeholders acknowledged that the clothing industry requires new technology, capital, expertise, machinery and skills to be able to compete. It was revealed that apart from the influx of cheap products another problem the clothing industry is dealing with there is the influx of second hand goods. It has resulted in many Ghanaian manufacturers focusing their attention on the export market because the local market sales are very low.

The stakeholders indicated that manufacturers have to depend on the import of raw materials such as fabrics and accessories. They have to pay more unlike manufacturers in China and other countries that have direct access to raw materials used in their operations. One of the stakeholders indicated that part of

the problem may be due to the collapse of the textile industry but thinks that it should be revived and operated in order to produce fabrics for production of clothing in the industry. She suggested that in the interim the government should deal with textile industry in China and other countries that could supply the industry directly without going through an intermediary by creating outlets that would sell fabrics in a subsidized way. One of the stakeholders was of the view that as the country has well educated and trained people in the clothing sector, ready labour and is strategically positioned in the sub region, the industry should focus on mass production as explained in the excerpt;

> For a developing country, textiles and garment should be of great interest to us because the developed countries are moving away from doing these things. America is not thinking about how to sew clothing today, they are thinking about high tech stuff computers, building aeroplanes, satellite and those things. If you go to Europe, they are thinking of major machines to do all kinds of things. Most of the garments today are produced in China where they have the labour and with generally good technology. Here we also have cheap labour, we have reasonably good number of educated people we have trainable level indeed our interest must be in garment production. (STH03)

6.4.4 Enhancing the Performance of the Clothing Industry

The analysis revealed that the industry can perform well if certain measures are put in place. The stakeholders suggested that the government should reduce smuggling of textile and clothing items to the country, ensure the payment of appropriate duties and tax, put regulations in place and prevent shoddy products, and then it will be able to enhance the clothing industry. One of the stakeholders was also of the view that the government should be able to support the industry financially and reduce tax on the importation of raw materials thereby saving the industry from external forces. Furthermore, the results revealed that manufacturers should have competent and cooperative personnel who can push the quality of their products, as the following statements illustrate,

> There are a lot of potential so you need to develop the necessary mechanism to make that potential work for us. We should police the smuggling in of textile such that people pay the appropriate duties, tax and all that. If they were to pay the appropriate tax, our local industries will become more competitive. The questions we must ask ourselves are; can we do the policing well enough, do we have some regulations in place, which at least prevent the shoddy products, or the second-hand products then the local companies will be a bit more competitive. (STH03)

> The future for me I think is bright if government would support the industry and then the effort of the manufacturers because money and technology alone cannot make one successful. If you have your capital, machinery and expertise and you lack the managerial competent or capability definitely you would not succeed. (4)

It was evident from the analysis that government should implement policies that can help the local industry. The stakeholders indicated that trading between

countries could still go on but there should be control, checks and measures to sustain the local industry. One of the stakeholders stated that the government should set up infrastructure, give support to the companies financially and working capital or credit facilities through the banks, provide training facilities and avenues for marketing of products. All stakeholders point out that policies should be in place to enhance the products of the individual manufacturing companies. The stakeholders were of the view that when these policies are implemented manufacturers would be bound to engage with them. One of the stakeholder added that policies can be enforced through education. Another specified that products imported into the country should also conform to the national standards. Participants stated that there should be a body to determine and regulate price of goods in order to control prices.

All the stakeholders were of the view that there should be a change of attitude, concept, and thinking towards “made-in-Ghana product”. They were of the view that if people decide to patronise made-in-Ghanaian products the industries would grow. One of the participants stated that, “when people are patronising there will be so many producers and there would be competition which will bring down price. Therefore, I would say we need a complete re-orientation of the Ghanaian psychic towards made-in-Ghana products. The government has a major role to play, the individuals has a role to play and companies also have a role to play” (STH02).

6.5 Chapter Summary

In this chapter, profiles for the participants of the clothing companies and the stakeholders were presented. All companies with exception of one were private owned. The majority of participants were highly educated in other fields other than clothing but had some training in clothing. The stakeholders interviewed were employees in organisations who had worked longer with their respective organisations. It was revealed that the organisational structure for the individual clothing manufacturer depended on the size in terms of the number of employees and their capacities. The majority of medium and large-scale companies have very well structured organisation as well as some of the small scale companies. Results revealed that all the companies have vision and mission statements although not all of them have clearly written them down. The majority of participants were aware of emerging technology and information systems, improved methods and new machinery on the market that could enhance and speed up production but the

majority of them could not afford them. Companies promote their establishment and market their products through advertising using various means including business card, brochures, handouts and fliers, website, the media in the form of sponsoring charities, attending trade fairs, exhibitions both internally and externally, catwalks and fashion shows to promote their companies in and outside the country.

The results from the manufacturers and stakeholders suggested that no official clothing anthropometric survey has been conducted in the country, as a result, there is no statutory size charts used by the clothing industry. The various manufacturers have adopted size charts from sources such as the UK, USA and the International Standards (ISO) for the production of ready-to-wear clothing. The sources of size charts coupled with other factors such as freehand cutting, manual cutting and human error have resulted in variations in the various sizes. Results revealed that coding and labelling of clothing sizes also create problems for consumers. The manufacturers code their clothing using numerical or alpha numerical which sometimes pose a problem for the customers. Even though the aim of coding is to aid the easy identification of sizes, it was revealed by the manufacturers that customers find it difficult to relate well with all these codes. It was also revealed that the manufacturers intentionally maintain sizes, which do not conform, to the required size tables in order to cater for those who fall in between two sizes. The majority of participants expressed that the development of a standardised size chart is crucial to the development of the Ghanaian clothing manufacturing industry.

Issues concerning clothing standards and government policies were also analysed. Results revealed that most of the participants were not aware of any clothing standards that are used to regulate the activities of the clothing industry. The majority of participants however indicated that they are members of various clothing associations but expressed the view that none of these associations has the mandate to monitor the standards of their companies. Although most of the participants indicated that the industry has improved over the years and is doing well especially among African clothes despite the numerous problems, there is still more to be done to reshape the clothing industry. It was revealed that many challenges facing the clothing industry included capital, skills, efficiency, modern machinery and expertise. The results indicated that the performance of the

clothing industry can be improved if the government is able to tackle smuggling of clothing and textiles products, by ensuring the payment of appropriate duties and taxes, policing, and preventing shoddy products into the country.

Chapter 7: Analysis of Consumers Focus Group Discussion and Questionnaire

7.1 Introduction

This chapter presents the analysis of the focus group discussions conducted with clothing consumers. The discussions are designed and conducted to address Aim 2 of this study: evaluating the consumer perception of body shape and size and their effect on clothing choice. The findings are analysed using the following categories: perception of body shape and body size, effect of body shape and size

on body image, body shape and size in relation to clothing choice, satisfaction and dissatisfaction of body shape and size, perception about clothing sizing and fit issues, and practices of the local clothing industry in relation to sizing and other issues.

7.2 Background of Participants of Focus Group Discussions

Twenty four students aged 18-35 years participated in the focus group discussions. The participants were purposively selected from the 842 women measured during the anthropometric survey, which was conducted as part of the study. The selection of the participants for the discussion has been explained fully in Chapter 4, Section 4.3.1. Four groups were formed and each consists of six participants. The grouping was done based on the ages of the participants to ensure maximum involvement from each participant. The 4 homogeneous focus groups (18-22, 23-27, 28-31 and 32-35 years old) comprised of single women, married women and women who have given birth to allow for diversity of views pertaining to the evaluation of the body shape. For the purpose of the study codes were generated for easy identification, recording and to ensure the confidentiality of the participants. The following codes were assigned to each group and their members: Focus group1 was coded FG/A (A1-A6) with participants age 18-22 years, Focus group 2 was coded FG/B (B1-B6) with participants age 23-27 years, Focus group 3 was coded FG/C (C1-C6) with participants age 32-35 years and Focus group 4 was coded FG/D (D1-D6) with participants age 28-31 years.

7.3 Perception of Body Shape and Size

Participants were asked to express their views on body shape and body size. It was revealed that participants were concerned about their appearances in relation to their body shapes and sizes especially addressing issues concerning clothing sizes and fit. Participants of the various groups expressed feelings about their body shapes and sizes in relation to the various topics.

7.3.1 Understanding of Body Shape and Size

The prevalent views expressed by the participants on the understanding of body shape and size were on description of the body. These descriptions are summarised as the physical outline, appearance, looks, contours, and curves of human figure. Another common view shared by the participants was that the

human shape determines the body size, which also dictates the body measurements. For most of the participants body shape is the silhouette in which clothing takes shape and classifies the individual into body sizes. The following are some selected excerpts from all the groups;

> … the body shape defines the person's appearance and helps us to check our body size. (FG/A4)

> A human figure helps us to find ourselves in our various body sizes of which measurements are taking to classify us under the designated sizes, examples size 8 or 10. (FG/B5)

> With the body shape, every individual has a particular shape or silhouette so when you take the measurements of that person it determines the size of the person. (FG/C2)

> ... the body shape is your physical something [looks] that everybody sees and then can say this person has a broader hip or has a small waist this person a proportionate figure. However, the body size is how bulky or fat a person is. (FG/D1)

These quotes illustrate that, the body shape is the physical embodiment of the individual, which is seen outwardly and is able to help determine how small or big the size of the individual is and describe a person. It is evident that women can be categorised in various sizes depending on the body measurements. The body size determines the body measurements of the individuals. Other participants also used expressive words such as smallish, slender and fat, top- heavy and bottom-lighter to explain body shape and size. A few of the participants also used descriptive words such as rounded, well-shaped, flat buttocks and big bust to explain body shape. Participants from FG/A1 expressed that the body shape can be proportionate or disproportionate depending on the relationship between the bust, the waist and the hip. For a number of participants from this group, a good shape can be seen from the size of the bust, waist and hip as the three following statements illustrate,

> When we talk of a good shape, you have to look at the person's bust, waist and hip. The person is supposed to be maybe, bust 36, waist 28, and hip 38 or 40. I think that is a good shape because with that you will be able to fit into most ready-to-wear dresses, but when you have bust 40, waist 30, hip 35 you will find it difficult getting ready-to-wear clothing. (FG/A3)

> You should have a small waist then followed by the bust and the hip but if you have it the other way you can't fit into some sizes. It is going to be difficult for you to get ready-to-wear clothing. Those who have big bust sometimes want to wear dresses that fit those with small bust but they always have fit problems. (FG/A1)

> … it's about the curves in the body mostly we talk about "coca cola bottle shape" that is top small, smaller waist and bottom heavy shaped. Sometimes a person may have a bust of 36, a waist of 24 and a hip of 38 you can actually see the shape. Another person may have a bust of 36, waist of 34 and a hip of 28 that is also a shape all right but not proportionate. (FG/A6)

From the above statements, participants identified bust, waist and hip as the three key dimensions used to define the shape of the body. The majority of participants were of the view that women are very particular about the bust, waist and hip measurements. Most of the participants were also of the view that people with asymmetrical body proportions may have difficulty in selecting ready-to-wear clothing because their bodies may not conform to the normal sizing. Though they identified this as a major problem, some participants were quick to say that there are other alternatives where a person can choose different sizes of clothing for the upper and the lower torsos. Some also disagreed with this explanation but think that it will be easier and simpler to have one size for the whole body.

The majority of participants also indicated that the shape of an individual may depend on certain factors, such as hereditary, lifestyle and diet. They articulated their assertion by saying that people may either grow fatter or slimmer or maintain the size of the body depending on what they eat and drink, whether they undertake some form of exercises or not and what type of exercise they undertake. One participant stated that;

> … someone's body shape and size depends on the food that she eats because if you like eating you will definitely grow fat and then probably you would be chubby that you would not look attractive but for somebody who is able to control the diet and exercise a lot you will be able to keep yourself fit and then maintain the figure. (FG/D4)

Though most of the participants agreed with the statement made by FG/D4, they also indicated that there are other factors that can cause women to grow fat. A participant drew the attention of other participants to the fact that there are some body shapes that have been inherited from the family therefore exercising or dieting would have little effect on their body shapes or sizes. FG/D6 affirmed the view expressed by the group by stating that,

> A person's body shape can be inherited from where the person is coming from. You look at the family and you realise they all have flat buttocks or they are really fat that tells you that the person inherited it from the family. (FG/D6)

One of the participants had this to say about herself to buttress the assertion made by (FG/D6) on the hereditary factor,

> ... it is our genetically makeup. The plus sizes run in my family. We have big mummy to big baby and there is nothing I can do. I have been a chubby and plump girl right from my infancy and I cannot hide this fact. (FG/B5)

Despite the general perception that over weight is due to bad eating habits and lack of exercising of the body, some participants expressed that there are some people who no matter how hard they try to exercise, can never be classified under

small or average size and therefore may be far from the world's appreciable body shape. The last statement from the above excerpts explains how FG/B5 feels about her situation and how she is coping with it since no amount of effort, appears to change her shape drastically.

7.3.2 Description of Body Shape

Participants were presented with a chart with six different body shapes and were asked to choose which one best describes their body and to explain why they chose that figure (ref). The body shapes include triangle, inverted triangle, rectangle, hourglass, diamond and rounded. Each shape was described to the participants in order to help them in their selection (See Appendix G). The results revealed that the highest shape category chosen by participants was the triangle shape and followed by the hourglass shape. A small number of the participants selected the rounded and inverted triangle but none rectangle and diamond. Participants who chose the triangle shape explained that they had small bust, moderate waist and a wide hip with moderate to large buttocks. This was verified by taking the individual body measurements after the discussions. The hourglass group defended their choice by expressing that they have moderate bust, small waist and the moderate hip. For the other shapes these are some of the excerpts explaining why participants chose particular shapes.

> I chose the rounded shape because I have always been like that though I have more hips. Even though I still have the perfect and well proportion body shape, the fatter you look the shorter and rounded you become and it is assumed you are rounded almost like a "ball" so I think I am rounded shape (FG/B5).

> I chose the inverted triangle because I think I am busty. I have a small hip size and that is why I chose the inverted triangle. (FG/B6)

FG/C3 and FG/C6 felt their body shapes did not match any of the shapes on the chart,

> I don't fall into any of these shapes. I would fall into an oval shape if it were to be here because I am not that busty, my waist is not that small, I have flat buttocks and I have a broad hip. I think that is my shape. (FG/C3)

> I would say none, because I don't have a very big hip and my bust is big but they are not the same so I don't fall in the rectangle shape, I don't fall in the triangle shape and I don't fall in the inverted triangle shape. My waist is not bigger than the rest of my body so I don't fall in the diamond shape and I am not round. (FG/C6)

Findings from the excerpts above revealed that participants have a good description of their bodies because they were able to compare all the shapes to their various shapes therefore drawing comprehensive conclusion afterwards. The

general opinion expressed by participants was that the triangle shape is associated with the African figure whiles the hourglass is associated with the Western world. A few of the participants felt strongly that it may not always be the case for the Western women's figure to be associated with the hourglass, as the following statements illustrates;

> The triangle shape is mostly common among Africans but the majority of Europeans have the hourglass shape so all the ready-made are based on their shapes. Most of the ready-made are made with the hourglass. (FG/A6)

> The ideal figure is the hourglass, which is normally associated with the teenagers and the young women in Ghana but their shape changes to probably the rounded after giving birth (FG/C3)

From the finding above, it is evident that a few of the participants have the perception that the hourglass shape is associated with Europeans. Most of the participants believe that images portrayed by the media, especially in films, clothing models, clothing magazines and catalogues, and from the celebrities and actresses, are often Europeans.

7.3.3 Description of Body Shape in terms of Weight and Height

Participants were asked to describe their body shapes in terms of weight and height. Majority of the participants admitted having normal weight and medium height, a few of them said they had normal weight and are tall, a marginal proportion admitted being overweight and some on the verge of being obese. They compared their weight to their height. Weight was expressed using underweight, Normal weight, overweight and Obesity by Body Mass Index (BMI) calculator. Height was described using short, medium, tall and very tall. The summary of the weight and height as indicated by the participants and the actual figures recorded through measurements by the researcher at the end of each session and the categorisation using BMI calculator can be seen in Table 7.1 shows.

Table 7.1 Description of Body Shape in terms of Weight and Height

Codes	Participants Description of Weight and Height		Calculation of Actual measurement taken from participants		Body Mass Index using (NHS)	
	Weight	Height	Weight Kg	Height Feet/Inch	BMI kg/m^2	Category
FG/A1	Normal	Medium	52	5.2/62	21.0	Normal
FG/A2	Normal	Tall	55	5.8/68	18.4	Underweight
FG/A3	Normal	Medium	59	5.5/65	21.6	Normal
FG/A4	Over weight	Medium	85	5.6/66	30.2	Obese
FG/A5	Normal	Tall	60	5.7/67	20.7	Normal
FG/A6	Normal	Medium	54	5.2/62	21.8	Normal

FG/B1	Normal	Medium	68	5.6/66	24.2	Normal
FG/B2	Normal	Tall	62	5.6.66	22.1	Normal
FG/B3	Over weight	Short	60	5.2/62	24.2	Normal
FG/B4	Normal	Tall	60	5.4/64	22.7	Normal
FG/B5	Over weight	Medium	88	5.3/53	34.4	Obese
FG/B6	Normal	Short	45	5.0/60	19.4	Normal
FG/C1	Normal	Tall	65	5.7/67	22.4	Normal
FG/C2	Normal	Tall	53	5.2/62	21.4	Normal
FG/C3	Normal	Medium	57	5.3/63	22.3	Normal
FG/C4	Normal	Tall	52	5.6/66	18.5	Normal
FG/C5	Normal	Short	57	5.1/61	23.7	Normal
FG/C6	Obese	Medium	85	5.6/66	30.2	Obese
FG/D1	Normal	Tall	65	5.7/67	22.4	Normal
FG/D2	Normal	Medium	54	5.5/65	19.8	Normal
FG/D3	Normal	Medium	51	5.3/63	19.9	Normal
FG/D4	Normal	Tall	65	5.6/65	23.1	Normal
FG/D5	Normal	Short	63	5.1/61	26.2	Overweight
FG/D6	Normal	Medium	55	5.4/64	20.8	Normal

BMI Categories are as follows: Underweight = <18.5, Normal weight = 18.5-24.9, Overweight = 25-29 and Obesity = BMI of 30 or greater.

Most of the participants were able to summarise their bodies by using words or phrases such as, normal weight and medium height or normal weight and average height. Comparisons made with the actual body measurements proved that most of them fall between 51kg and 68kg and three of the participants were over 85kg. Only one participant was 45kg. For the height eleven participants confirmed that they were of medium height, four indicated they were short, the remaining nine indicated they were tall. From the Body Mass index calculation it is evident that most of the participants were able to give the correct information of the weight and height because the BMI calculations correlated well with how they described their bodies. A few of the participants either understated or over stated the way they perceive themselves in terms of their weight.

7.3.4 The Ideal Body Shape

Participants were asked to choose their ideal body shape. Findings revealed that the hourglass and the triangle shapes were the desired ones among majority of the participants. Although most of the participants accepted that the ideal shape is the hourglass, they also agree that the ideal shape may be relative because individuals may perceive the body differently. The participants were of the view that an ideal shape can also be influenced by looking at it from a regional context where the societal norms outweigh other personal and societal opinions. The majority of participants indicated that perception of an ideal shape in the African sense may be different from other societies taking into consideration their beliefs and cultural practices. Some participants made the following statement:

> It will depend on the beholder as we say beauty lies in the eye of the beholder. With the African perspective, the traditional African woman should be plump or fat because the more

> flesh you have the healthier you look and unfortunately the slimmer you look the sicklier you are. (FG/B5)
>
> … it is a general norm in Africa traditional custom, to be a healthy woman in Africa you have to look fleshy. In Europe if you are skinny the better because they are those who look healthy and if you are fat that means you have a problem with your weight. In Africa when you are fat you look wealthy, healthy, and happier and it shows all is well with you. (FG/C4)

Three school of thoughts however emerged from the discussions, one group was of the view that hourglass is the ideal shape and the other group choose the triangle as the ideal one. The third group strongly felt that every shape is unique and different and as such, there is no one ideal shape. The following excerpts were extracted from the various discussions in each group. The participants from the first school of thought stated that,

> …with the hourglass figure clothes fit better than the others and they are able to wear fitted clothes without problems. Ready-made garment fit them well. (FG/C1)
>
> The hourglass shape is the ideal one because with this one when you buy a dress you do not necessarily take into consideration your stomach or the waist because you know that definitely the waist will fit well… (FG/D4)

To participants in the second school of thought,

> …. despite the fact that the hourglass shape figure is ideal to me every design should have its focal point about human figure so I also think the triangle shape is also a close contender especially if you have a flat tummy. I love that kind of shape. (FG/B5)
>
> My ideal shape is the triangle shape in a sense that you have a small breast, moderate waist and a big hip. (FG/D4)

For the third school of thought the hourglass may be ideal one but they also think otherwise, this view is illustrated in the following statement,

> The hourglass shape looks ideal but I do not want to associate myself with any particular shape, because, I think that we are all very different and unique. Some people may have big bones naturally at the shoulders so there is nothing the person can do to change her shape. Maybe she has to hide some and all that. I have to maintain my weight not to be overweight. (FG/B3)

The three groups emerged with divergent views of an ideal shape. One group debated that the hourglass shape is the most perfect one among all the shapes, the second group however is of the view that, the shape of a Ghanaian woman resembles the triangle shape. This second group is of a strong view that the Ghanaian societal standard for the ideal figure is closer to the triangle shape and not the hourglass. The final group also argued that every shape is unique and should be seen as ideal. Following the discussion, one can deduce that though participants expressed their perception of what an ideal figure in the Ghanaian context is, some of them still prefer the hourglass because they are of the view that clothing will fit well on such a shape. Others participants still insisted that in

the African context in the ideal shape should be the triangle because that is what is perceived by the society as an ideal type looking at how a Ghanaian woman looks like.

7.3.5 Preference for Body Shape

To conclude this session participants were asked whether they aspire to be any particular body shape other than what they presently are. From FG/A group all the participants expressed the desire for the hourglass shape. One of the participants had this to say “I will go for the hourglass and it is because I model I would like to have a small waist” (FG/A5) another participant stated “with that any dress you wear fit well because the waist is shape well” (FG/A3). The remaining participants in the group shared the same view with the last statement. From the FG/B group majority of the participants indicated that they aspire for the hourglass. Their reasons were similar as that of the first group. Those who did not aspire for the hourglass admitted that it is impossible for them to attain this figure. From the FG/C group, participants shared two views, one for the hourglass and one for the triangle shape. Three of the participants who had given birth before pointed out that the problem is with their weight and waist size because they have given birth there is little chance of having an hourglass shape. One participant suggested exercising can reduce the size of the waist but for another it is difficult to be consistent with exercising of the body. One of participant however advised that;

> If you aspire for something, you would go for it […] if you want a smaller waist and you start with the exercise you have to continue once you stop you are in for trouble because you are going to grow even bigger. (FG/C6)

Another participant felt that,

> It is only through exercising the body, changing diet, and self discipline that can help a person maintain a good looking body shape. (FG/C4)

Findings strongly shows that the desired shape should be worked at in a hard way by showing self-discipline, towards eating and exercising the body regularly. Participants of the fourth group were divided between the hourglass and the triangle shape. In totality, participants desire a good shape such as the hourglass although they think that the triangle is also good. The issue of the problem of waist dominated all the discussions.

7.4 Effect of Body Shape and Size on Body Image

Participants were asked to express their views concerning the effect of body shape and size on body image. Participants expressed their views on this topic and the majority accepted that body shape and size may have positive or negative effect on a person. Two major factors that can affect a person's image positively or negatively were identified as the perception of the individual and the societal perception.

7.4.1 Personal Influence on Body Shape

The participants were of the view that the feelings an individual has towards her own body can influence her in a positive or a negative way. Most of the participants, from all the groups, acknowledged that the perception the individual has concerning the body shape makes them withdraw from others and avoid the public. Some become frustrated and embarrassed because of the way they feel towards their bodies. One participant also pointed out that, some individuals feel bad about the way they are and this results in self-pity, changing mood and behaviour, as may be seen from these excerpts:

> ... my weight sometimes gets me a little down honestly, I hate it when people constantly remind me of how I look. I know I am fat and genetically it runs through my family. We are all large sizes. (FB/B5)

> Some people who are obese, overweight or small may feel embarrassed and may not want to go out but stay home because when they go out they become point of attraction and people will be looking at them and making funny comments. They may feel like they are not part of the society. (FG/A/4)

> … I have always wished to eat. For me I am small but I have a big bust I don't want it this way I want it to be small as I am. It is affecting my image. (FG/B6)

> … with me I am short so currently most of my clothes do not fit because I am growing fat and I have realised the fatter I become the out of shape I become so sometimes it makes me a little down. (FG/B3)

FG/B1 and FG/B5 provided statements that describe their feelings towards their bodies and how they affect their health as well,

> My bust is so heavy that when I put on a brassier sometimes I feel the pain at the shoulders. That is my problem. When I put on a dress I sometimes think people are looking at me it seems my upper part is so huge than my lower part so I sometimes complain to my friends. (FG/B1)

> … I think so right now I don't like it at all because I wasn't that way and I also know the swollen feet is as a result my weight …. (FG/B5)

The above statements are clear indication of the extent to which people could be affected by the way they perceive themselves. To others like FG/B1 and FG/B5 it can have detrimental effect on their health and emotions. With the experience

shared by one participant, it became evident that some professions have set their own parameters that go against the individual and societal standards thereby rejecting people who do not meet the set criteria as described in this excerpt:

> Your shape and size pushes you back, for instance, with me because I am into the modelling sometimes when you go for auditions they have this kind of measurements that they look for. They prefer those with bust 34, waist 26 and then hip 36. Sometimes you feel like you do not have a good shape but you also think you are okay and maybe outside there you don't meet their standard (FG/A5)

From the above excerpts, the individual may perceive herself as perfect but some professions may not be ready to compromise their set standards and requirements on body size especially the modelling agencies. Though the refusal is based on the preference of the profession, the rejection of these individuals may in turn adversely affect them even though they may have good body shapes.

Although people may not appreciate their body shape and may think they have some degree of defects, suggestions were made by some participants that they can use clothing to emphasise or de-emphasise the good and bad parts of the body. The majority of participants were of the view that the body shape may look good in some dresses and not in others. For a person to be satisfied with the body shape components of the clothing such as the colour, style, fabric and fabric design, accessories and stitches should be chosen carefully as explained in the following statements:

> There are garments and styles that camouflage our body defects so if you have a fault somewhere or you have a big bust and big hip with a very small waist I believe you can get a style be good for the body. The details in the fabric can make you also feel good. (FG/C2)

> There are garments that can boost the bust and after wearing it you shouldn't be looking over your shoulders. After you've enhance it you have to feel good exactly as the one who has the bust. Therefore, it shouldn't have effect on your image. FG/C6)

The prevalent view was that body shape restricts the type of clothing one chooses. Some participants admitted that wearing bigger or smaller dresses, which does not fit your body shape, reduces your confidence as expressed in this excerpt,

> Body shape can affect the person's image in that someone who is very fat will be restricted from wearing certain garments, even looking at the shape alone can tell you that you have to be wearing skirt all along so it can really affect the person's image. (FG/D6)

A number of participants emphasised the need for the individual to be confident and know which clothing suits and fits her body type but not to be pulled along by various fashion trends. They indicated that the individual should be able to know to what extent they can go and not be embarrassed in some of these dresses. Participants accepted that body shape can deny one from wearing some types of

clothing. FG/C6 clearly felt that building confidence, “depends on how you carry yourself, how you believe in yourself and believe in making the good out of what you have, it won’t have any effect on your body image so my body size and my body shape hasn’t got any effect on my body image”.

7.4.2 Societal Influence on Body Shape

The results revealed that the individual’s create an appearance that is similar to the cultural ideal of a group of people. It is evident that in certain societies slim attractive women are seen as ideal figure while with others the plump women are seen as attractive woman. They therefore believe that what is referred to as an ideal figure may be dictated by the society. The majority of participants agreed that Ghanaian society may not accept a slim woman as their ideal woman’s shape. It was therefore evident in all the group discussions that what society accepts may affect the image of a person positively or negatively. The following excerpts were extracted from the one group:

> It will depend on where you find yourself and the way they see you, how big or how small you are. People even take medication to grow fat so this alone should tell you that in our part of the world, in Africa they see fat people to be people who are healthy, who eat well so it depends on which part of the world you find yourself. (FG/D6)

> The perception the society has on body shapes and the funny names giving prevent people from feeling at ease when they are out there, the society impression about shapes affect some individual who fall in that category. (FG/D3)

> I would say that your body shape and your body size sometimes affect your body image in the sense that in this world people who are very fat or too tall are really mocked at and therefore it affect your image. You may be fat but that is not the end but because you are mocked at if you are not strong enough you will be affected. (FG/D1)

The results from the excerpts above indicate that participants from all the groups admitted that society influence people and they expect the individual to conform to the standards set. Participants expressed that the individual will have a positive feeling towards the body partly because it is what the society accept but will lose confident if the individual doesn’t fall outside the standard of the society. FG/D6 stated that accepted societal norms may vary from one place to the other and therefore generalising certain issues may not be loose appropriate. She made some comparisons with other culture as seen in this excerpt,

> When you look at the Western countries people who are fat are not really seen as fashionable but they see them to be people who are eating anyhow and don’t take good care of themselves, so they try to go to gym to trim. Even old women do that but here in our part of the world you realise that when you are slim they would asked why you don’t eat meanwhile in abroad those who are slim are seemed to be fit and healthy. (FG/D6)

From the excerpt above the participants expressed how women in the Western world may do everything to keep bodies in good shape, looking healthier and good looking. Some of the participants expressed that there has been infiltration of other cultures in Ghana, for instance, the influence of education, religion and communication. This has resulted in some classes of people in the society seeing the need to keep their bodies on check. They agreed that some women are making conscious effort of keeping their bodies healthy and good by joining keep fit clubs, going to the gym and involving themselves with all kinds of exercises that will trim their body shape and size.

7.5 Body Shape and Clothing Choice

Participants were asked about their views on body shape and clothing choice. Majority of participants agreed that body shape has direct influence on the choice of clothing. The results further revealed that selecting clothing should be done by assessing the body shape in relation to the type of clothing chosen to compliment the body shape. Some of the participants indicated that clothing could be used to enhance some parts of the body. Some of the participants expressed their views by making these statements:

> Yes, because someone will say I do not have hips so I can put on trousers, another person will say, because of my shape I cannot fit into some particular dresses. Because of the way they perceive themselves they don't wear some garments because they know that their shapes are not good enough for certain type of garments. (FG/A2)

> Your body shape can affect the kind of dress you select. I have a cousin who is the same size as her mother but she has wider hips so whenever she buys a dress, she shares the garment with the mother. When the mother wears, the dress it fits her all right but when she wears the dress the hip pulls the dress up so now when she is buying a dress she makes sure that it is wide enough to take care of her hip. (FG/D6)

From the excerpts above, participants realised that choosing particular clothing may be guided by the body shape. The results also indicated that the majority of women choose clothing that complement their body shape and derive a degree of satisfaction and good fit. Most of the participants are of the view that specific clothing may look different on different bodies and as such give different effects.

The prevalent view among the participants was that, what is visualised as good clothing may be appropriate for someone but may not be appropriate for another person because they have different body shapes. A participant expressed the view that some women will choose only clothing that will make them appear attractive

therefore avoiding any clothing that will emphasise the bad aspects of the body shape as explained as follows:

> There are various human figures and each has style that flatters it and each has style in respect to the good point of the figure just as you have a bad one. (FG/B3)

Some participants indicated that choosing particular clothing can either enhance the appearance or not. Other participants pointed out that even though people are aware of the result obtained from wearing an inappropriate clothing some women may still be influenced by fashion trends and choose clothing in vogue not necessarily the one that will complement the body shape thereby eventually having fit problems.

7.5.1 Factors that Influence Clothing Choice

Most participants admitted that the type and features of clothing can have direct influence on the body shape. The majority of the participants agreed that, there are some factors that need consideration when choosing clothing and these may include; the uniqueness of the style, fabrics with suitable motif and textures, colours and their meanings, suitability of the accessories, decorative stitches and finishes. The results established that the shape of a person could influence her choice of clothing. The majority of the participants are of the view that appropriateness of clothing may depend on the features of clothing as indicated in the following excerpts:

> … I look at my figure type and how the stitches and some details in the garment can enhance it. (FG/ C4)

> I also look at the style and the motifs. I do not normally like small motifs but big ones because I am smallish and that makes me go for big motifs just to make me look the average. I also consider colours. (FG/A1)

> I consider the size of the motifs because I am already fat and if I go in for motifs which are big I would be more than fat so I go in for the ones with smaller motifs and consider the colour too I don't like brighter colours. (FG/ B6)

> I consider the colour and then the texture. I am heavy and it makes me sweat a lot so I like fabrics that breathe, absorbs, and will not clinch to my skin because it makes me feel fretful. I also look at the design and style because I am large I like to take some few emphasis. I am into a lot of asymmetrical cut and some few drapes I also look at the designs I do not like large motifs because I try to avoid glossy fabrics as much as possible. (FG/ B4)

The above statements further show how components of clothing could affect the wearer by giving a positive or negative image. Participants reiterated the need for careful selection of clothing by considering the style, the fabrics used and colours by relating it to the body and how the clothing can fit the body shape. The findings

also revealed that the functions of the clothing play an important role in the selection of clothing in relation to the body. The majority of participants share the view that clothing should be comfortable to wear, have fabrics with suitable motifs, textures, style, and colour, which can flatter the body shape.

7.5.2 Limitations in Clothing Choice

All the participants acknowledged that the body shape may limit the individual's clothing choice when choosing clothing. A participant expressed the view that because of the way people look, some types of clothing, which others can wear easily and have good fit, will be a problem for another person. A participant explained that sometimes the desire to wear particular clothing outweighs the consideration given in terms of the body shape, which may result in dressing inappropriately. Most of the participants expressed that every individual in one way or the other may be limited in choosing a type of clothing as the following quotes illustrate,

> I have been restricted from putting on a straight dress because of my shape. When I put on a blouse and a skirt I do not like the one with gathers and all that because I am fat I prefer the ones with band that actually fit. (FG/ B1)
>
> I also do not normally like clothes with many folds because of my height it makes me short and looks bigger so I choose clothes that cling more to the body. (FG/B3)
>
> I normally have a problem with my waist because after birth giving my waist has increased and it does not really fit in many clothes which it use to fit in. (FG/C1)
>
> You sometimes go out in the shops for once you want to buy something for a special occasion. You want to wear a particular style but because of your heavy bust you can't wear that. Sometimes wearing a strapless bra would not make you feel too comfortable and if you want to wear something with stripes, you cannot do it. (FG/C6)
>
> My waist and hip fit but my bust does not normally fit. I have broad shoulders so much often it limits me that is why I am comfortable wearing stretchy fabrics. If the fabric does not stretch, I cannot wear it because it may feel uncomfortable at the shoulders and at the neck. (FG/B5)

These excerpts show how individuals may be limited in choosing some type of clothing because of their body shapes. Participants indicated that knowing the body shape reduces the tendency of wearing clothing that expose the body weakness and as such affecting the personality and mood. The above statements clearly compare the body shape with some type of fabrics and style, which may not be suitable for the body.

7.5.3 Body Cathexis and Clothing Choice

The satisfaction of clothing is strongly related to the satisfaction and dissatisfaction of the body shape. Participants expressed their views on the relationship between clothing satisfaction and body cathexis. The results revealed that participants appreciate their bodies when in clothed state than in the unclothed state. This was evident when they expressed their satisfaction of some parts of the body when in a clothed state and have to express their dissatisfaction of the same parts of the body when they are in the unclothed state.

A participant FG/B2 stated that, “what I admire most is my bust because I think it is okay not too small or too big,” the same participant acknowledged later that, “normally when I buy a dress the waist and the hip fit better than the bust. I do alteration at the bust and it feels okay”. These two declarations show that one will perceive the body differently either in the nude or the clothes state. A person may be satisfied with some body parts in a clothed state but dissatisfied when in an unclothed state. Another participant FG/C6 also made this statement, “I don’t have a problem with my bust or my hip but I have a problem with my waist and I intend to work on it but I am satisfied the way I am, my height, my bust, my hip, it is just for my waist”. She however made this comment during the discussion on clothing satisfaction, “I normally have problems with my bust area, my jackets and my blouses seem to gape if they have buttons in front. I like trousers a lot because it fit well around my hip, though sometimes a little bit tight around my waist and it fit perfectly and I like the way it looks on me”. From the above excerpts women’s satisfaction from one part of the body to the other may be seen differently because it may look different when in a cloth state. For some of the participants satisfaction is obtained from the type of dress one chooses.

7.6 Satisfaction and Dissatisfaction of Body Shape and Size

All participants expressed the way they feel towards their various bodies. From the discussion, the individuals were able to evaluate their body shape and size by relating it to the ideal figure. The perception of an ideal figure and what influences the choice has already been discussed in Section 7.3.4 of this chapter.

Participants were asked which part(s) of the body they were satisfied and dissatisfied with. In this section results revealed that the majority of the participants

are satisfied with some parts of their bodies. The data shows that, the most prevailing body dimensions indicated by majority of the participants as most satisfactory were bust and hip dimensions, others are hair, facial features and legs. However, in contrast they were most dissatisfied with their waist. A few of the participants added that they are dissatisfied with their arms, legs, shoulders and the calf. One participant stated, "I am satisfied with my bust and my hip but with my tummy I think I have to do some exercise" (FG/ D4). Another participant stated, "I like my bust and my hip but I don't like my waist" (FG/A5). A number of them complained about their waist and they are of the view that the only solution to have a flat trim waistline is for them to start exercising. Some of the participants were also displeased about their bust, some feel their bust were too small while others see it as too big. The following excerpts shows the extent to which the participants like and dislike some parts of the body,

> I am satisfied with my hip area. A lot of people admire it but my problem is my bust, for my waist I can work at it when I try but my bust I don't know its discourages me more because it is 'dropping' it is adding to my problems. (FG/C5)
>
> For me even though people admire my bust I do not like it because it looks over size on me. I had always wished it had been small for me. I prefer my waist and admire it most. (FG/B6)
>
> I like my hip and my hairy legs people admire them a lot but I hate my waist and shoulders because they are too broad. I wish my tummy was flatter. There are times I would work as much as 80 sit-ups every morning. It flattens for a while and comes back. I wish I were a little taller. (FG/B5)
>
> For me I am not comfortable with my waist and calf, the reason is my calf is small, my waist is bigger, I want my waist to be smaller and my calf to be a bigger than what I have now. FG/A6

From the above excerpts, areas of the body with the greatest satisfaction were the bust and the hip, the most concerned was the waistline. These excerpts indicated how people could be satisfied and dissatisfied with some parts of the body. Even though some participants suggested that these body dimensions sometimes could be camouflaged or enhanced by using clothing or through cosmetic surgery; they assumed that cosmetic surgery may not be readily available and even if it is, it will be beyond the means of the average Ghanaian woman. Some participants expressed the views that the effects of these surgeries are worrying and suggested that the waist in particular and other parts that need reducing could be done through exercising or by using clothing to enhance them.

In contrast to the above results of satisfaction and dissatisfaction from majority of participants, several others expressed either total satisfaction or total

dissatisfaction towards their bodies. These were statements made by FG/A2 and FG/C1 to ascertain their claims about the total satisfaction they feel towards their bodies. FG/A2 said, “I am satisfied with my tummy, my waist and my hip and FG/C1 expressed her total satisfaction this way “I am satisfied with the way I am, my height and my body measurements”. This shows that there are individuals who have confidence in themselves and therefore have positive impression about their body shapes as discussed in Chapter 6 Section 6.4. A few participants were dissatisfied with body shapes as indicated in these statements:

> I have a problem with my body. I want to put on weight around my hip, a little on my waist then my bust so that I would be fat than my present shape. (FG/C4)
>
> Sometimes I wished that I was a little tall because clothes in my perception looks good on people who are a bit tall and wish that my waist would be a little smaller. I am okay with my bust. (FG/B3)

These statements show two extremes of body shape, a fatter and a smaller body shapes. These two participants are all trying to either reduce or increase in size. They expressed their dissatisfaction because they have strong negative feelings for the bodies.

7.6.1 Satisfaction and Dissatisfaction from Ready-To-Wear Clothing

The participants were asked to express their satisfaction and dissatisfaction with ready-to-wear clothing. Almost all of the participants responded to state that at some point in time they have enjoyed a degree of satisfaction of wearing some type of ready-to-wear clothing. The results indicated that the majority of participants were satisfied wearing dresses. Some prefer straight ones; others also preferred dresses with pleats or gathers. A number of participants also preferred any two-piece clothing for instance a skirt and a blouse or a trouser with a blouse. For FG/B2 a semi fitted blouse and a panel skirt looks good on her, someone also proposed the corset type and others had specific types of the clothing they have chosen. These explanations can be observed from the following statements:

> I will go in for the straight dress because I like them so much. It looks simple on me and I feel okay in it so I will go for the straight dress (FG/A1)
>
> I will also go in for the straight dress but straight with pleats at the waist because it fit me. (FG/A1)
>
> Full dress makes me looks vibrant and I feel good in it. (FG/D6)
>
> I think I like the straight dress because it fits me better. I prefer those ones. (FG/D2)
>
> Full-dress fit well in a sense that it brings out my shape and everything, my waist, hip and buttocks it makes me look nicer and cute. (FG/D1)

The following show excerpts from other participants who also said they look good in blouses, shirts and skirts,

> With the blouse, I prefer a corset type since it leaves my shoulders free. I also have to be particular about picking a corset because of my broad shoulder and of the skirt, though the pencil will fit I find it too tight when I wear it because of my ample bust. People find it provocative and it borders me sometimes so I prefer panel, but I hit gathered and pleated skirt. (FG/B5)

> Any garment that comes in two pieces fit perfectly, it could be a skirt suit, a skirt and a blouse, a trouser suit, a trousers and top because of my waist a dress doesn't look too good on me so once it is two piece. Anything that hold my waist or tighten it a little bit with a flowing something on it suit me. (FG/ C6)

Others prefer trousers and blouses,

> I prefer putting on sleeveless tops and maybe with trouser because if I put on a dress with a sleeve it makes my bust looks broader. (FG/B6)

> I like wearing trousers a lot about 99% of my clothes are trousers it fit well and I feel good in it. (FG/C1)

> I feel good when I am in trousers because it enhances my hip area. I also love to wear trousers anywhere I go at all times because it fit very well. (FG/ C2)

> I go in for the trousers and long skirts anything long to cover my legs. (FG/A4)

> I also feel comfortable and satisfied with trousers because it enhances my hip area. (FG/C5)

A number of the participants preferred skirts and dresses. One participant expressed her view, as "I also feel comfortable when I wear skirts and straight dress. I also like to wear slit and kaba (traditional wear) or a blouse with a long or short skirt".(FG/C4) A few participants however indicated that they are satisfied with all types of clothing, "I will go in for a long pencil or short skirts with the hot colours, dresses blouses, long sleeve shirts and trousers". (FG/A3)

7.7 Perception of Clothing Sizing and Fit Issues

Clothing sizing is a very important aspect of clothing choice. Individuals choose their clothing based on sizes and they are always expectant of good clothing fit. Participants expressed their views on clothing sizing and fit issues. The results revealed that the perception of participants on the ready-to-wear clothing, clothing sizing in relation to coding, information on tags and clothing fit.

7.7.1 Knowledge about Clothing Sizing

Participants were asked about their knowledge of clothing sizing and fit. This was essential because clothing are produced using standardised body sizes, which are obtained from the body measurements taken from the individual body size. Most

participants understood ready-to-wear as clothing produced using standard sizes, which is readily available in different sizes, styles, fabrics and colours. A participant added that ready-to-wear clothing are mass produced ranging in different sizes. Another participant explained that the ready-to-wear is made to fit the wearer and to meet the taste of the consumer. To another participant, it is produced without using direct measurements as custom made ones but with a standard one determined from a vast range of body measurements taken from different people. The majority of participants however indicated that there is the possibility that not everyone will be satisfied with the clothing fit and may even have problems choosing between two sizes. Some of the participants were of the view that the availability of ready-to-wear clothing solved the clothing needs of the modern day Ghanaian women. They also indicated that ready-to-wear allows them to go for clothing anytime they need a new one. In terms of price, some participants believe it is always fixed. Some participants were also of the view that most of the time custom made clothing is cheaper as compared to ready-to-wear clothing but they may prefer to buy the later in order to save time and to have good fit. The following are excerpts from statements made by participants on ready-to-wear clothing;

> One thing about ready-to-wear clothing is that it is made with measurements from people but not your particular measurements. It is not made specifically for you. It is made with specific measurements that are from somebody somewhere. (FG/A6)

> Ready-to-wear clothes vary in sizes. It is readily available so whenever you are attending any occasion and you do not seem to have any suitable attire you just go and pick your size from a shop and that is it. (FG/A1)

> I will say that it is not the direct measurements but actually the standard one, which has been used to produce it. You go in there and choose so it is not something that it is produce for you in person but it is produced for everyone. (FG/B1)

Most of the participants expressed that ready-to-wear clothing are mostly associated with the western countries. In their view the concept of ready-to-wear clothing started in the West and as such creating the sizes for the various clothing were also based on Western women's measurements. This is seen very clearly in a participant's view that 'ready-to-wear clothing are really typical with the Western countries.

7.7.2 Identifying Individual Clothing Size

Participants were asked to explain how they identified their clothing sizes. Some of the participants explained that they first became aware of their clothing size by

taking their bust, waist and hip measurements by comparing with the ready-to-wear clothing they intend to purchase. However, they expressed that it becomes difficult to compare without taking the measurements from the clothing because the labels do not specify the vital measurements used for the dress. The only option for them was to measure the clothing and compare with their own measurements. A participant explained that most Ghanaian women are used to going to the seamstress and taking their measurements for clothing to be produced for them.

The majority of participants felt that taking direct body measurements were because of the way some Ghanaian local retailers operate. The participants indicated that some of retailers are not receptive to consumers as markets elsewhere in the world. In addition, it was revealed that Ghanaian retail shops do not always have fitting facilities and return policy so there is no guarantee for the consumer. For these participants such a situation compels consumers to be sure of what size may fit them before finally choosing clothing.

For other participants they determined their dress size by using an orthodox or traditional method instead of size information provided in clothing. This they indicated was from the beliefs that have been passed down to them by the older generation. It is interesting to note that they determine their skirts and trousers sizes by wrapping them around their neck since they believe the waist size is twice the neck size. The following statements explain their support for these claims;

> Being an African I learnt it from some of my old folks back home. There is a belief that the thickest of the neck can be used to determine the girth of your waist but unfortunately, I have slightly thicker neck, and my shoulders are thick and if I rely on my neck it will be loose or just up to the waist size. It is okay sometimes but do not fit most of the time so I depend on the tape measure. (FG/B5)

> Most of the time when I buy a skirt I usually put it around my neck to check and if it reduces at the back of my neck then it means it will fit but if it is loose it may be bigger than me. When it does not reach the back of my neck then it will be very small for me. (FG/ B2)

Although this method is widespread in the country and used by the majority of the population informally, some participants strongly expressed that it may not work out all the time because this method can be deceptive. A number of the participants emphasised that this method has failed them and should therefore not be generalised. The majority of the participants expressed the view that the most positive way of choosing clothing is based on the information on the clothing tag. However they concluded that information about the sizes is always not adequate

and is often less informative since vital body measurements do not come with the size added to it thereby picking a correct size can only be done through fitting. The participants specify that a Ghanaian woman can change drastically within a few days so fitting of clothing needs to be carried out in order to help select the right size. This statement is supported by following excerpts extracted from the participants;

> The letters on the label are very vague. They are not informative to the buyer so most of the time the customer will have to rely on the person who is selling it. (FG/B3)
>
> The information on the tag is not enough for the dress for instance somebody might know the bust and the hip size but may not know the dress size so I think it is not enough. (FG/ D1)
>
> It is not enough concerning the size maybe as D1 said earlier on that in the UK and US they have different sizes. You should know the US and the UK sizes so that you know exactly what you want. (FG/ D5)
>
> Sometimes I am not able to interpret or understand the letters they write on the tag so I become confuse as to whether it will fit, in such cases I always ask the one in charge if it will be okay for me. (FG/B1)

The majority of participants expressed that different size codes for ready-to-wear clothing available in the market place resulted from different manufacturers. They complained of different size codes between the same sizes among producers and from countries. Most of the participants stated that these size codes are confusing and since there are no returning policies one need to be sure if the clothing will fit. One participant emphasised that it is essential to check sizes based on the country it is coming from. The following shows some extracted excerpts from the discussion;

> When I go to a shop, I choose size 8 or sometimes a medium size. This may vary from country to country. I check where the garment is coming from and I made my choice due to the origin of the garment. (FG/A1)
>
> It is not enough maybe they should provide the bust, waist and the hip measurements in it so that when somebody picks it she will know her measurements. It is not only for one market. (FG/A6)

Findings revealed that the ready-to-wear clothing currently available on the market are coded differently by various manufacturers and countries. One participant made the comparison that a size 8 in British may be smaller than an American size 8, but bigger than a Chinese size 8 so depending on where one is buying from there can be variations. She therefore expressed that it is therefore possible for one to pick a size, which may fit perfectly but may pick the same size from another manufacturer, which may not fit well.

7.8 Ghanaian Clothing Industry and Sizing Issues

The production of the ready-to-wear clothing is based on sizing and fit issues. For an individual to accept her body shape may depend on the fit of clothing. Consumers may need to choose from a range of sizes developed to help the industry categorise their clothing. Participants shared their views on the operations of the clothing industry.

7.8.1 Development of Sizing System for Ghanaians

Most of the participants are of the view that there should be Ghanaian size charts for the production of clothing in Ghana. The participants felt that if the local manufacturers are able to use size charts developed using the measurement from the women of Ghana, they would be able to sew right sizes for them and this will attract people to buy their products. Most of the participants expressed that the issue of size charts and other related factors have resulted in the low patronage of ready-to-wear clothing produced locally. A number of the participants admitted that size charts could work effectively only when the people within that population were involved in the process of size chart development.

> The body size is important because we, Africans are unique on our own. If the Europeans, American and Asians have been able to develop a chart for their countries, we can also do the same. I believe they use the standard measurements from European and USA to produce the garments that come into the country. (FGB5)

Most of the participants, from all the groups, placed a great deal of importance on the need to have a size chart based on the body shapes of the Ghanaian woman. To most of them, the numerous clothing fit problems are because of the use of sizes based on Western or American sizing system and other women in other countries. They strongly advocate for a sizing system that would be based on Ghanaian women since they think their body shapes are different from that the European or other women as expressed in the following excerpts;

> We should also have standard measurements for our kind of body shape and sizes especially in Africa when we do that our clothes would fit better. (FG/B3)

> Ghanaians should produce standard measurements like those that the Europeans have done so that we can also get sizes for our clothes. We can produce garments, which will attract a lot of people in the country. (FG/A6)

It is evident from the above statements that the development of size charts based on the body measurements taking from Ghanaians is needed. To these participants using a Ghanaian based standard measurement will improve on the output of the local market. They therefore agreed to the fact that the local

producers should be able to produce clothing, which fits the Ghanaian woman better than foreign manufacturer. This comments emerged from the discussion about patronising locally made products.

> The local producers should do well to enhance or place emphasis or hide our defect. Unlike the ready-made garment produced in USA or UK they have different body measurements and different body sizes so they turn to build on that and cut to fit the body size. They did not consider the African size. (FG/C5)
>
> The designers should also look at the figure before designing so that they do not produced unsuitable styles for Ghanaians. One thing they have to check is the figure shape and type before considering a design for them (FG/A5).
>
> … I do not know how they actually get their sizes when they are sewing. I do not know whether they use the standard ones, I don't think so because for some of the dresses you know that you fall between this and that size but you put it on and it does not fit. It is as if the person did not consider the body shape because it may look shapeless on you. (FG/B1)

The above statements are clear indications of the low performance of the local industry. They stipulated that the industry should be more critical on the sizes when producing designs for clothing and subsequently take care of other related factors to enhance products and boost the patronage of the locally manufactured products. One of the participants expressed that a company may have a good size chart but can still perform poorly and have clothing fit problems. Some participants acknowledged that the clothing manufacturers are focusing on the design rather than size and fit. They added that the industry might be able to meet the demands of the consumer unless they are fully organised and cater for all aspects of producing clothing.

7.8.2 Consumer Perception of the Clothing Industry in Ghana

Participants were asked to express their views on the performance of the local clothing industry. The majority of participants were of the view that although the industry has grown over the years there are some important issues that need to be addressed properly for it to attain high patronage of locally produced clothing. Participants acknowledged that most Ghanaian do not patronised locally made clothing as compared to the imported ones and second hand products. Participants attributed this behaviour of consumers to the finishing, packaging, design, fabric and stitches of clothing. Some of the participants accepted that most of the Ghanaian clothing are well designed aesthetically but the finishing is not up to standard. The majority of participants indicated that stitching of the clothing is one of the problems they have associated with locally made clothing and most consumers complain about as the excerpts illustrate;

> I feel they should put in more effort in what they produce. The stitches are not too good they should be careful about how they do their stitching so that it will be a neat. (FG/A6)
>
> They should check on their stitches sometimes you take them home, wash it for a few of times then you see the thread unravel. They should check when stitching a garment. (FG/B4)
>
> … Those who produce with good quality concerning the finish are few but the majority don't take care when finishing a garment. We have many people who have learnt to sew who come out and don't even know what finish is all about [...] so you realise that most of the time they sew well from the outward look but when you look at the finish it is very poor They need to work on this area during production. (FG/C6)

From the above findings participants complained of stitching in a finished clothing. Participants attributed this problem to the low standard of production of some of the companies. They explained that most of these companies who produce shoddy or sub-standard clothing show a sign of incompetence on the part of both management and the employees. One of the participants also added that most of these companies do not have the necessary finishing equipment to enable them finish clothing well. She also added that the companies who have these machines might sometimes not have the skill to operate them.

Most of the participants also complained of the quality of fabrics used by some of the clothing companies. They were of the view that these companies use low quality fabrics and without varieties for production as compared to the ready-to-wear clothing, which are imported. A few of the participants acknowledged that some companies use good quality fabrics but their products are expensive. Two of the participants shared their views on quality "I think they should work on the quality of fabrics for the clothing they produce" FG/B6 the other participant acknowledge, "I think they should check the quality of the fabric because with some of the fabrics, the colour fades out when you wash it once" FG/B6. Findings revealed that most consumers perceive any of the clothing manufactured locally as not of good quality. It was evident from the findings that Ghanaians patronise foreign goods more than the locally produced ones. Participants were of the view that not anything produced locally are of high quality and they would rather purchase any clothing foreign. Participants expressed that consumers should make the effort to accept the local industry by patronising their products as shown in the following statements;

> The perception that people have concerning locally produced clothes and foreign one has to do with the quality. The imported ones are of a better quality in terms of finishing and they are cheaper. (FG/B3)
>
> People are not too satisfied with most the local manufacturers because their products especially with the finishing are very poor. (FG/C3)

Although some admitted that the design and style of the products are good, a few others were of the view that the companies should be more creative in their design and use of colours to make their products more attractive. One of the participants expressed that "I also think they should be a little bit creative. They should not copy the same things others do. At least if they are copying they should modify it" (FG/A3). A number of the participants were of the opinion that most of the locally produced clothing are very expensive although they admitted that there are various levels of standards of the clothing companies as they have target in the market. They acknowledged that the companies, which produce high and good quality clothing normally, target the elite and the high class citizens. Other companies may price their goods low to moderate but may not attract many consumers because of the quality of clothing they produce. The results revealed that consumers turn to buy imported clothing more than the locally produced ones because they are cheaper and of good quality as the following excerpts illustrate;

> In my opinion, I think the local manufacturers are too elitist they like to design for what they termed the well to do forgetting that they are just a handful out of a population of about 22 million in Ghana, leaving us the masses. I usually do not like patronising their goods because it is too expensive. (FG/B5)

> I have a problem with the prices because everybody will like to get his or her money worth for any goods purchase. I think the prices are too high. (FG/B5)

The majority of participants also proposed that there should be an organisation to regulate the pricing system in the country. Participants were of the view that because there is no price regulation it leaves the companies to set their own prices therefore allowing them to charge unreasonable price for their product.

7.8.3 Consumer Expectation from the Local Clothing Industry

Participants were of the view that the industry can perform well only when certain measures are put in place. Results revealed that the companies as well as the government have a role to play in order to enhance the performance of the clothing industry. Participants were of the view that the government can help the local industry by sustaining the micro-small scale industries by giving subsidies and tax free and revitalise the textile industry. One of the participant also suggested that the micro- small scale could team up and produce in large quantities in order to improve production and reduce price. The following extracted excerpts illustrate;

> The government should try to help sustain the micro- small scale industries because they are the very fibre of our development without them we cannot make any head way. (FG/B5)

> Most of the designers can come together and do something about our clothes so that more made-in-Ghana good would be produced. (FG/B3)

On the other hand, participants indicated that the clothing industry can enhance their products by organising refresher courses periodically for their employees. One participant suggested that the managers should also be able to source for courses that can enhance the performance of their employees. A few of the participants also indicated that the companies should conduct market research in order to know the preference of the consumers and be abreast of what is going on around the world. One of the participants made this statement " I think they should put in more research as well as interacting with people to know what they like most especially the youth"(FG/ D7).

7.9 Consumers Questionnaire Findings

This section outlines the results obtained from questionnaires conducted for clothing consumers**.** The sample consisted of females between the ages of 18 and 35 years drawn from the two regions identified as the study areas. Data was collected between June and August 2010. Out of the 400 questionnaires that were distributed, 381 useable ones were returned, which yielded a response rate of 95.25%. The summary of the distribution and collection of questionnaires is presented in Table 7.2. Statistical Package for the Social Sciences (SPSS) 18.0 version for windows was used for analysing the data. One-way analysis of variance (ANOVA) was used to compare mean differences between the groups and a post hoc Multiple Comparison Scheffe test to determine the difference within the group.

Table 7:2 Questionnaires Distributed and Collected

Regions	Questionnaires Distributed	Questionnaires Collected	Percentage (%) Collected
Greater Accra	220 (55%)	215	56.4%
Ashanti	180 (45%)	166	43.6%
Total	400 (100%)	381	100.0%

n=381

7.9.1 Demographic Characteristics of the Respondents

The demographic characteristics of the respondents include age, occupation, education, income, marital status and childbirth status. The distribution of age of the respondents varied, with the following categories representing the largest percentage of the population: age 23-27 (33.6%), age 32-35 (28.8%), age 18-22

(19.4%) and age 28-31(18.1%). The majority (54.6%) of respondents were students, with the highest percentage of respondents (63.6%) not married and majority (63.0%) not have given birth. Eighty eight (23.1%) of the respondents indicated a total family monthly income of ¢1601.00 and above. The majority of respondents indicated polytechnic (39.6%) and university (29.1%) as their highest level of education. The distribution of the demographics of respondents is presented in Table 7. 3.

Table 7.3 Demographic Characteristics of the Respondents

Demographic Variables	Frequency	**Percentage**
Age		
18-22	74	19.4
23-27	128	33.6
28-31	69	18.2
32-35	110	28.8
Total	381	100.0
Total Family Monthly Income		
Below 400.00	70	18.4
401.00-700.00	61	16.0
701.00-1000.00	41	10.8
1001.00-1300.00	50	13.9
1300.00-1600.00	40	10.5
1601.00 Above	88	23.1
Not Responded	28	7.3
Total	353	100.0
Highest Level of Education		
Junior/Senior Secondary	70	18.4
Technical/vocational/Commercial	32	8.4
Polytechnic	151	39.6
University	111	29.1
Others	17	4.5
Total	381	100.0
Occupation		
Student/Unemployed	208	54.6
Professional (Teacher/Nurse/Lawyer)	85	22.3
Businesswomen/Traders	33	8.7
Secretary/Clerical	25	6.6
Other Jobs	30	7.9
Total	381	100.0
Marital Status		
Not Married	241	63.3
Married	134	35.2
Divorced/Separated/Widowed	6	1.6
Total	381	100.0
Childbirth Status (Number of children)		
1	43	11.3
2	47	12.3
3	35	9.2
More than three	14	3.7
None	240	63.0
Not responded	2	0.5
Total	381	100.0

Note: Percentages may not equal 100.0% due to rounding.

7.10 Body Cathexis

Body cathexis is associated with the satisfaction of the various body areas of an individual. Body cathexis in this study was evaluated through the following body areas: neck, shoulder, arm, bust, waist, abdomen, buttocks, hip, thigh, knee, leg, calf, weight, height and overall appearance.

7.10.1 Descriptive Statistics of Body Cathexis

Respondents were asked to rate their satisfaction or dissatisfaction of body cathexis. A five-point Likert scale with the following choices was used very satisfied to very dissatisfied. For purposes of discussing the body cathexis of respondents, very satisfied and satisfied were combined to determine satisfaction, and those who were dissatisfied and very dissatisfied were combined to determine dissatisfaction. Satisfaction and dissatisfaction were determined when the score was 50% and above. The respondents who indicated higher scores of satisfaction for all body areas were between 60-89%, respondents who were neither satisfied nor dissatisfied were between 7-18% and respondents who were dissatisfied were between 2-22%. The summary distribution of responses for all the body areas given by respondents is presented in Table 7.4, the percentage and the frequency with which the respondents indicated their satisfaction are presented in Table 7.5.

Table 7.4: Summary of Respondents responses to Satisfaction of Body Cathexis

Body Cathexis	Satisfied (%)	Neither Satisfied Nor Dissatisfied (%)	Dissatisfied (%)
Neck	89.8	7.6	2.7
Shoulder	84.5	10.0	5.5
Arm	79.2	14.2	6.6
Bust	80.1	11.0	8.9
Waist	77.2	11.3	16.0
Abdomen	60.0	16.5	22.8
Hip	84.8	9.2	6.0
Buttocks	78.5	12.6	8.9
Thighs	82.1	12.1	9.7
Legs	75.1	15.0	9.8
Calf	73.3	17.6	7.1
Knee	75.0	16.0	8.2
Weight	64.8	18.9	16.2
Height	74.3	13.6	12.1
Overall Appearance	84.5	10.0	5.2

n=381

Table 7.5: Frequency Table indicating Satisfaction with Body Areas

Body Areas	Very Satisfied		Satisfied		Neither Satisfied /Nor Dissatisfied		Dissatisfied		Very Dissatisfied		Not Responded		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Neck	200	52.5	142	37.3	29	7.6	9	2.4	1	0.3	0	0.0	381	100
Shoulders	165	43.3	157	41.2	38	10.0	17	4.5	4	1.0	0	0.0	381	100
Arm	156	40.9	146	38.3	54	14.2	19	5.0	6	1.6	0	0.0	381	100
Bust	163	42.8	142	37.3	42	11.0	30	7.9	4	1.0	0	0.0	381	100
Waist	152	39.9	142	37.3	43	11.3	42	11.0	2	0.5	0	0.0	381	100
Abdomen	142	37.3	88	23.1	63	16.5	61	16.0	26	6.8	1	0.3	380	100
Hip	181	47.5	142	37.3	35	9.2	20	5.2	3	0.8	0	0.0	381	100
Buttocks	150	39.4	149	39.1	48	12.6	31	8.1	3	0.8	0	0.0	381	100
Thighs	167	43.8	146	38.3	46	12.1	18	4.7	2	0.5	2	0.5	279	100
Legs	145	38.1	141	37.0	57	15.0	31	8.2	6	1.6	0	0.0	381	100
Calf	162	42.5	125	32.8	67	17.6	24	6.3	3	0.8	0	0.0	381	100
Knee	156	40.9	133	34.9	61	16.0	22	5.8	9	2.4	0	0.0	381	100
Weight	128	33.6	119	31.2	72	18.9	50	13.1	12	3.1	0	0.0	381	100
Height	150	39.4	133	34.9	52	13.6	35	9.2	11	2.9	0	0.0	381	100
Overall Appearance	182	47.8	140	36.7	38	10.0	16	4.2	4	1.0	1	0.3	380	100

n=381

7.10.2 Relationship between Demographic Factors and Body Cathexis

One-way analysis of variance (ANOVA) was used to determine the relationship between body cathexis and demographic factors. The ANOVA statistical test identified the F-statistics, significance probability values (p), and multiple comparison Scheffe test. It assisted in examining the means of subgroups in the sample and analyses of variance. Post hoc Scheffe multiple test identified the sub-factors where significant differences were present.

Age and Body Cathexis

The results showed significant differences between age groups and the level satisfaction of some of the body areas; abdomen ($F=5.909$, $p\leq0.001$), waist ($F= 4.708$, $p<0.01$), thigh ($F=4.013$, $p\leq0.01$), hip ($F=3.575$, $p\leq0.05$), bust ($F=2.975$, $p\leq0.05$), and weight ($F= 2.921$, $p\leq 0.05$) as shown in Table 7. 6.

Table 7.6: Results of ANOVA test on Age and Body Cathexis

Variables	Mean Scores of Age groups				F-Value	Significance (p)
	18-22	23-27	28-31	32-35		
Neck	4.34	4.44	4.36	4.40	.322	.810
Shoulder	4.03	4.21	4.33	4.19	1.534	.205
Arm	4.09	4.19	4.14	3.95	1.337	.262
Bust	4.01	4.27	4.28	3.95	2.975	.032*
Waist	4.12	4.19	4.07	3.74	4.708	.003**
Abdomen	3.57	3.76	3.72	3.15	5.909	.001***
Hip	4.03	4.41	4.33	4.25	3.575	.014*
Buttocks	4.03	4.13	4.30	3.92	2.529	.057
Thighs	3.93	4.28	4.31	4.05	4.013	.008**
Legs	3.89	4.10	4.19	3.87	2.174	.091
Calf	3.91	4.02	4.01	4.05	.373	.772
Knee	3.86	4.06	4.03	4.01	.667	.573
Weight	3.72	3.97	3.80	3.55	2.921	.034*
Height	3.92	4.14	4.01	3.84	1.708	.165
Overall Appearance	4.22	4.40	4.29	4.12	2.088	.101

*p≤0.05, **p ≤0.01, ***p ≤0.001

A post hoc multiple comparison Scheffe test was conducted to find out the differences in mean for the age groups as shown in Table 7.6. This method was chosen because it is suitable for analysing data, which has an unequal numbers of respondents in the groups. The results showed differences within the age groups for the following body areas. For the abdomen, the differences were within age group 23-27 and 32-35 (p≤0.01) and age group 28-31 and 32-35 (p≤0.05). The differences for the hip were shown within the age group 18-22 and 23-27 (p≤0.05). Results indicated differences for thigh within age group 18-22 and 23-27 (p≤0.05). In the case of weight, age group 23-27 was different from18-22 (p≤0.05). The post hoc test for bust and waist showed no difference within the age groups. The results showed that the respondents between ages 22-28 years were more satisfied with their bust, hip, thigh and weight than the age group 29-35 years. The age group 18-21 years were less satisfied with their thighs.

Marital Status and Body Cathexis

The ANOVA results showed significant difference between groups for marital status for some of the body areas. The body areas include neck (F= 5.852, p≤0.01), shoulder (F=5.925, p≤0.01), waist (F=5.078, p≤0.01), arm (F=3.110, p≤0.05) and overall appearance (F=4.147, p≤0.05) as shown in Table 7.7.

Table 7:7 Results of ANOVA test on Marital Status and Body Cathexis

Variables	Mean Scores and of Marital Status			F-Statistic	Significance (p)
	Not Married	Married	Separated/ Divorced/ Widowed		
Neck	4.34	4.53	3.67	5.852	.003**
Shoulder	4.21	4.22	3.00	5.925	.003**
Arm	4.16	4.01	3.33	3.110	.046*
Bust	4.18	4.07	3.33	2.584	.077
Waist	4.15	3.81	3.83	5.078	.007**
Abdomen	3.64	3.38	3.00	2.661	.071
Hip	4.28	4.22	4.00	0.411	.663
Buttocks	4.07	4.10	3.67	0.610	.544
Thighs	4.12	4.23	3.67	1.779	.170
Legs	4.02	4.02	3.67	0.362	.696
Calf	3.97	4.07	3.67	0.973	.379
Knee	3.98	4.08	3.33	1.955	.143
Weight	3.77	3.78	3.17	0.875	.418
Height	4.04	3.93	3.17	2.283	.103
Overall Appearance	4.31	4.22	3.20	4.147	.017*

*p≤0.05, **≤0.01, ***≤0.001

A post hoc test showed significant difference for satisfaction with the neck and shoulders within respondents who were not married and those who were separated widowed or divorced (p≤0.01). For shoulder, there was significant difference of level of satisfaction within all the three groups (p≤0.01). For overall appearance, the differences were shown within all the three groups (p≤0.05). Results indicated significance difference for waist within those who were married and those who were not married groups (p≤0.01). This showed that those who were not married were more satisfied with their waist and overall appearance than those who were married. This confirms the findings from the focus group discussions, which revealed that married who have children were dissatisfied with their waist because they were larger.

Childbirth Status and Body Cathexis

The ANOVA test suggest childbirth status of the respondents influence certain variables in relation to body cathexis as shown in Table 7.8. There were significant differences between the respondents for the following variables: waist (F=4.751, p≤0.001), abdomen (F=5.885, p≤0.001), weight (F=4.441, p≤0.01), legs (F=4.480, p≤0.01), neck (F=2.519, p≤0.05), and overall appearance (F=3.914, p≤0.05).

Table 7.8: Results of ANOVA test on Childbirth Status and Body Cathexis

Variables	Mean Scores of Childbirth Status					F-Value	P
Number of Children	1	2	3	More than 3	None		
Neck	4.63	4.51	4.31	4.00	4.36	2.519	.041*
Shoulder	4.35	4.34	4.23	3.64	4.17	2.198	.069
Arm	4.23	4.02	3.86	3.64	4.14	1.859	.117
Bust	4.21	4.19	3.89	3.64	4.16	1.626	.167
Waist	4.07	3.74	3.77	3.29	3.15	4.751	.001***
Abdomen	3.79	3.40	2.91	2.64	3.67	5.885	.000***
Hip	4.19	4.26	4.17	3.86	4.31	1.080	.366
Buttocks	4.21	4.11	3.94	3.43	4.12	2.148	.074
Thighs	4.42	4.11	4.14	3.71	4.15	2.053	.086
Legs	4.35	4.00	3.80	3.14	4.03	4.480	.002**
Calf	4.26	4.09	3.97	3.71	3.96	1.413	.229
Knee	4.33	4.15	3.80	3.64	3.97	2.378	.051
Weight	4.26	3.68	3.37	3.14	3.78	4.441	.002**
Height	4.12	4.02	3.71	3.71	4.02	1.013	.401
Overall Appearance	4.50	4.26	3.94	3.64	4.31	3.914	.004**

*p≤0.05, ** p≤0.01, ***≤0.001

Post hoc test revealed that for waist there was significant difference between satisfaction of body areas for those who had no children and those who had more than three children (p≤0.05). For the abdomen significant difference were shown within all the groups (p≤0.01). For legs, the difference was within all groups with the exception of those who had only two children (p≤0.05). With weight, there was significant difference within those who had one child and those who had three and more than three (p≤0.05). Finally, in relation to overall appearance there was difference between respondents who had one child and those who had more than three children (p≤0.05). There was no significant difference within groups for neck. It showed that those who do not have children were more satisfied with their waist, abdomen, legs and weight than those who had children. However, those who have one child were more satisfied with their overall appearance.

7.10.3 Body Cathexis and Body Shape

The ANOVA test revealed significant difference between body shapes and the following body areas: legs (F=4.958, p≤0.001), buttocks (F=4.179, p≤0.001), abdomen (F=2.873, p≤0.05), and shoulder (F=2.298, p≤0.05) and shown in Table 7. 9.

Table 7.9: Results of ANOVA test on Body Shape and Body Cathexis

Body Areas	Mean Scores of Body Shape						F-Value	P
	Triangle	Inverted Triangle	Rectangle	Hourglass	Diamond	Rounded		
Neck	4.37	4.33	4.35	4.41	4.35	4.57	.245	.942
Shoulder	4.31	4.20	4.00	4.17	3.65	4.43	2.298	.045*
Arm	4.12	4.00	4.09	4.11	4.06	3.86	.242	.944
Bust	4.17	3.93	3.83	4.18	3.94	3.93	.996	.420
Waist	4.06	4.13	3.87	4.09	3.82	3.29	2.055	.070
Abdomen	3.52	3.33	3.48	3.69	2.82	2.86	2.873	.015*
Hip	4.31	4.13	4.09	4.31	3.82	3.93	1.672	.140
Buttocks	4.20	3.87	3.78	4.15	3.35	3.57	4.179	.001***
Thighs	4.15	4.20	4.00	4.20	3.88	4.14	.587	.710
Legs	3.96	4.47	3.95	4.12	3.00	3.86	4.958	.000***
Calf	3.94	3.80	4.13	4.07	3.88	3.86	.703	.621
Knee	3.87	4.27	4.22	4.08	3.65	3.93	1.598	.160
Weight	3.57	3.53	3.96	3.91	3.88	3.43	2.018	.075
Height	3.95	4.53	4.09	3.94	4.18	3.93	1.019	.406
Overall Appearance	4.28	4.00	4.09	4.32	4.12	4.07	.862	.507

*p≤0.05, ** p ≤ 0.01, ***p ≤0.001

A post hoc test indicated significant difference between body cathexis and body shape. The test revealed that in terms of satisfaction and dissatisfaction of legs, there were significant differences within the following groups: inverted triangle and diamond shapes (p≤0.001), hourglass and diamond shapes (p≤0.001), and triangle and diamond shapes (p≤0.05). It indicated further that there was significant difference for the satisfaction of buttocks within those who chose triangle and diamond shapes (p≤0.05). The test revealed no significant difference within the groups for the abdomen and the shoulder.

The results showed that respondents who chose the inverted triangle, triangle and hourglass shapes were satisfied with their legs more than those who chose the diamond shape. Those who chose triangle shape were more satisfied with their buttocks than those who chose the diamond shape.

7.10.4 Body Cathexis and Clothing Choice

The differences in the means for clothing cathexis and clothing items were calculated using one-way analysis of variance (ANOVA). Specific areas of the body, which related directly to specific items of clothing were selected.

Loosely Fitted Dress

The results from ANOVA test showed significant difference for thigh (F=4.497, p≤0.001), shoulder (F=2.913, p≤0.05) and calf (F=2.968, p≤0.05) as shown in Table 7.10.

Table 7.10: Results of ANOVA test on Body Cathexis and Loosely Fitted Dress

Variables	Mean Scores of Loosely Fitted Dress					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.50	4.20	4.40	4.43	4.63	2.264	.062
Shoulder	4.39	4.05	4.23	4.23	3.79	2.913	.021*
Arm	4.21	3.86	4.19	4.02	4.08	2.197	.069
Bust	4.98	3.86	4.10	3.96	3.83	1.684	.153
Waist	4.17	3.86	4.10	3.96	3.83	1.467	.212
Abdomen	3.74	3.46	3.50	3.55	3.50	.608	.657
Hip	4.44	4.08	4.29	4.23	4.13	1.703	.149
Buttocks	4.12	3.87	4.17	4.11	4.00	1.511	.198
Thighs	4.20	3.82	4.28	4.17	4.29	4.497	.001***
Legs	4.09	3.72	4.12	4.02	4.04	2.351	.054
Calf	4.15	3.72	4.10	4.00	3.92	2.968	.020*
Knee	4.00	3.95	3.80	4.05	4.19	1.688	.152
Weight	3.95	3.61	3.77	3.62	4.04	1.421	.226
Height	4.14	3.77	4.00	4.00	4.21	1.418	.227
Overall Appearance	4.35	4.06	4.29	4.38	4.33	1.527	.194

*p≤0.05, ** p≤0.01, ***p≤0.001

A post hoc test indicated significant difference of satisfaction in thigh for respondents who sometimes wear loosely fitted dress and those who wear them most of the time (p≤0.05). For calf, the difference was shown within the groups who wear loosely fitted dress most of the time and those who sometimes wear them (p≤0.05). The test results indicated significant difference level of satisfaction for buttocks within those who rarely wear semi fitted dresses and those who wear them most of the time (p≤0.05). The test indicated no significant difference within the groups for the shoulder. It showed that those who were satisfied with the thigh do not wear loosely fitted dresses.

Fitted Dresses

The results from ANOVA test indicated statistically significant difference for thigh (F=4.568, p≤0.001), waist (F=4.085, p≤0.01), abdomen (F=3.410, p≤0.01), overall appearance (F= 3.423, p≤0.01), hip (F=2.511, p≤0.05), calf (F=2.560, p≤0.05) and knee (F=2.624, p≤0.05) as shown in Table 7.11.

Table 7.11: Results of ANOVA Test on Fitted Dresses and Body Cathexis

Variables	Mean Scores of Clothing Choice (Fitted Dress)					F-Value	P
	Always	Most of the time	Sometimes	Rarely	Never		
Neck	4.48	4.38	4.35	4.32	4.46	.583	.675
Shoulder	4.23	4.10	4.22	4.30	4.04	.679	.607
Arm	4.25	4.09	3.99	3.92	4.12	1.422	.226
Bust	4.32	4.08	4.07	4.03	3.85	1.898	.110
Waist	4.26	4.08	3.94	3.73	3.58	4.085	.003**
Abdomen	3.80	3.37	3.64	3.24	3.12	3.410	.009**
Hip	4.37	4.33	4.23	4.05	3.85	2.511	.041*
Buttocks	4.24	4.02	4.08	3.89	3.85	1.604	.173
Thighs	4.16	3.95	3.95	3.62	4.23	4.568	.001***
Legs	4.11	3.97	4.08	3.78	3.77	1.334	.257
Calf	4.04	4.08	3.99	3.57	4.15	2.560	.038*
Knee	4.16	3.95	3.95	3.62	4.23	2.613	.035*
Weight	3.94	3.71	3.77	3.38	3.73	1.798	.129
Height	4.12	3.98	4.01	3.92	3.54	1.624	.167
Overall Appearance	4.47	4.28	4.19	3.89	4.19	3.423	.009**

*p≤0.05, ** p≤0.01, ***p ≤0.001

A post hoc test indicated significant difference within groups for fitted dresses and the following body cathexis variables; for waist, the difference was shown within groups who never wear fitted dresses and those who always were them (p≤0.05). For the thigh, the difference was shown within those who rarely wear fitted dresses, those who wear them most of the time (p≤0.05) and those who always wear them (p≤0.01). For the overall appearance, there were difference within those who rarely wear fitted dresses and those who always wear them (p≤0.05). The test did not show any significant difference for hip, knee, calf and abdomen. The results showed that those who were satisfied with their waist, abdomen, hip and overall appearance wear fitted dresses.

Long Length Dresses

The results from ANOVA test showed significant difference between groups for bust (F=2.895, p≤0.05), waist (F=2.491, p< 0.05), Calf (F=3.271, p≤0.05) and height (F=2.424, p≤0.05) as shown in Table 7.12.

Table 7.12: Results of ANOVA Test on Long Length Dresses

Variables	Mean Scores of Clothing Choice (Long Length Dresses)					F-Value	P
	Always	Most of the time	Sometimes	Rarely	Never		
Neck	4.55	4.40	4.38	4.27	4.26	1.362	.247
Shoulder	4.33	4.15	4.18	4.06	4.26	.834	.504
Arm	4.34	4.03	4.06	4.02	3.96	1.688	.152
Bust	4.42	4.06	4.00	4.27	4.00	2.895	.022*
Waist	4.27	3.92	3.99	4.12	3.67	2.491	.043*
Abdomen	3.73	3.40	3.60	3.57	3.07	1.862	.116
Hip	4.47	4.37	4.14	4.16	4.11	2.361	.053
Buttocks	4.23	4.05	4.00	4.24	3.89	1.395	.235
Thighs	4.23	4.21	4.11	4.10	4.07	.431	.786
Legs	4.11	4.07	3.97	3.96	3.85	.510	.728
Calf	4.30	3.82	3.93	4.06	4.07	3.271	.012*
Knee	4.12	3.99	3.94	3.92	4.19	.734	.569
Weight	3.93	3.54	3.86	3.69	3.67	1.659	.159
Height	4.26	3.87	4.03	3.86	3.63	2.424	.048*
Overall Appearance	4.47	4.13	4.26	4.20	4.26	1.606	.172

*p≤0.05, **p ≤0.01, *** p≤0.001

A post hoc test results indicated significant difference for bust within those who sometimes wear long length dresses and those who wear them most of the time (p≤0.05). For calf, the difference was shown within those who wear long length dresses most of the time and those who wear always them (p≤0.05). The results showed that respondents who were satisfied with their bust, waist, calf and height wear long length dresses.

Short Length Dresses

The results from ANOVA test showed significant difference between groups for waist (F=3.891, p≤0.01), arm (F=2.561, p≤0.05), bust (F=2695, p≤0.05), hip (F=2.882, p≤0.05), and legs (F=3.015, p≤0.05) as shown in Table 7.13.

Table 7.13: Results of ANOVA Test on Short Length Dresses

Variables	Mean Scores of Clothing Choice (Short Length Dresses)					F-Value	P
	Always	Most of the time	Sometimes	Rarely	Never		
Neck	4.44	4.45	4.31	4.37	4.52	.830	.507
Shoulder	4.26	4.23	4.17	4.10	4.19	.346	.847
Arm	4.25	4.15	4.10	3.76	4.23	2.561	.038*
Bust	4.30	4.21	4.00	3.93	4.45	2.695	.031*
Waist	4.28	4.17	3.91	3.69	4.16	3.891	.004**
Abdomen	3.54	3.70	3.50	3.29	3.61	1.164	.326
Hip	4.53	4.36	4.10	4.15	4.23	2.882	.023*
Buttocks	4.16	4.15	4.02	4.12	3.84	.867	.484
Thighs	4.28	4.21	4.13	4.02	4.10	.856	.491
Legs	4.18	4.16	3.84	3.81	4.26	3.015	.018*
Calf	4.07	4.01	3.96	3.93	4.16	.468	.759
Knee	4.09	4.12	3.91	3.98	3.84	.992	.412
Weight	3.63	3.92	3.81	3.58	3.68	1.206	.308
Height	4.05	4.12	3.86	3.92	4.06	1.029	.392
Overall Appearance	4.28	4.41	4.20	4.03	4.39	2.057	.086

*p≤0.05, ** p≤0.01, *** p≤0.001

A post hoc Scheffe test showed statistical significant difference for waist within the groups who rarely wear short length dresses and those who always wear them (p≤0.05). The test however indicated no significant difference for hip, legs, bust and arm. The results showed that those who were satisfied with waist hip, legs, bust and arm wear short length dresses.

Loosely Fitted Shirts and Blouses

The results from ANOVA test showed significant difference for height (F=3.589, p≤0.01) and shoulder (F=2.739, p≤0.05) as shown in Table 7.14.

Table 7.14: Results of ANOVA Test on Loosely Fitted Shirts and Blouses

Variables	Mean Scores of Clothing Choice Loosely (Fitted Shirt and Blouse)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.45	4.39	4.37	4.36	4.50	.274	.895
Shoulder	4.49	4.30	4.06	4.14	4.20	2.739	.029*
Arm	4.19	4.08	4.10	4.10	3.93	.364	.835
Bust	4.15	4.18	4.13	4.05	4.29	.253	.908
Weight	3.79	3.69	3.84	3.83	3.47	.839	.501
Height	4.32	3.86	4.01	4.14	3.47	3.589	.007**

*p≤0.05, **p ≤0.01, ***p ≤0.001

A post hoc result indicated statistical significant difference for height within those who never wear loosely fitted shirt and blouses and those who always wear them (p≤0.05). There was no significant difference within the groups for the shoulder.

The results showed that respondents who were satisfied with their height and shoulder wear loosely fitted shirt and blouses.

Sleeveless Shirts and Blouses

The results from ANOVA test showed there was significant difference between the bust and fitted shirts and blouses (F=4.067, p≤0.01) as shown in Table 7.15.

Table 7.15: Results of ANOVA Test on Sleeveless Shirts and Blouses

Variables	Mean Scores of Sleeveless Shirts and Blouses					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.50	4.41	4.35	4.42	4.24	.841	.500
Shoulder	4.30	4.30	4.17	4.02	4.05	1.521	.195
Arm	4.28	4.08	4.17	3.82	4.05	2.086	.082
Bust	4.47	4.01	4.05	3.93	4.39	4.067	.003**
Weight	3.89	3.80	3.63	3.63	3.98	1.165	.326
Height	4.14	4.01	3.95	3.84	4.00	.618	.650

*p≤0.05, ** p≤0.01 *** p≤0.001

A post hoc Scheffe test showed statistical significant difference for bust within the groups who rarely wear sleeveless shirts and blouses and those who always wear them (p≤0.0). It indicates that those who were satisfied with their bust wear sleeveless shirts and blouses. It was revealed in the focus group discussion that those who were not satisfied with bust may have problems with clothing such as jackets and blouses.

Long Sleeved Shirts and Blouses

The results from ANOVA test showed there was significant difference in height (F=5.142, p≤0.001) and weight (F=2.851, p≤0.05) as shown in Table 7.16.

Table 7.16: Results of ANOVA Test on Long Sleeved Shirts and Blouses

Variables	Mean Scores of Clothing Choice Long Sleeve Shirt and Blouse					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.53	4.42	4.41	4.26	4.41	.958	.430
Shoulder	4.45	4.13	4.25	4.08	3.96	1.959	.100
Arm	4.25	4.27	4.07	3.91	3.93	2.114	.079
Bust	4.35	4.20	4.17	3.86	4.07	2.135	.076
Weight	4.08	3.93	3.74	3.45	3.81	2.851	.024*
Height	4.40	4.08	4.07	3.64	3.56	5.142	.000***

≤0.05, ** p≤0.01 *** p≤0.001

The results from post hoc test show there was significant difference in height within the groups, who always wear long sleeved shirt and blouses and those who

never wear them (p≤0.05). No significance difference was shown within the groups for weight.

Trousers with Pleats in Front

The results from ANOVA test indicated that there were significant difference for thigh (F=2.421, p≤0.05), Calf (F=2.975, p≤0.05) and knee (F=2.775, p≤0.05) as shown in Table 7.17.

Table 7.17: Results of ANOVA Test on Trousers with Pleats in Front

Variables	Mean Scores of Clothing Choice (Trousers with Pleats)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Waist	3.86	3.92	4.12	3.94	4.08	.727	.574
Abdomen	3.29	3.57	3.69	3.28	3.64	1.776	.133
Hip	4.33	4.34	4.31	4.23	4.20	.394	.813
Buttocks	4.48	4.09	4.04	3.93	4.12	1.559	.185
Thighs	4.00	3.94	4.21	4.04	4.29	2.421	.048*
Legs	4.14	3.87	3.95	3.86	4.16	1.830	.122
Calf	4.05	3.85	4.04	3.77	4.16	2.975	.019*
Knee	4.05	3.91	4.04	3.73	4.16	2.775	.027*
Weight	3.76	3.72	3.96	3.51	3.83	1.863	.116
Height	4.24	3.98	4.18	3.75	3.99	1.958	.100

*p≤0.05, ** p≤0.01, *** p≤0.001

The results from post hoc test showed significant difference in calf, within those who never wear trousers with pleat and those who rarely wear them (p≤0.05). There was no significant difference within groups for thigh and knee. It showed that respondents who were satisfied with their legs, thigh and knee do not wear trousers with pleat in front.

Trousers without Pleats in Front

The results from ANOVA test showed significant difference in the thigh (F=4.766, p≤0.001), knee (F=4.274, p≤ 0.001), legs (F=2.602, p≤0.05), calf (F=2.960, p≤0.05) and as shown in Table 7.18.

Table 7.18: Results of ANOVA Test on Trousers without Pleats

Variables	Mean Scores of Clothing Choice (Trousers without Pleat)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Waist	4.14	3.97	3.97	4.16	3.93	.735	.568
Abdomen	3.55	3.63	3.47	3.41	3.62	.431	.786
Hip	4.38	4.31	4.20	4.26	4.04	1.260	.285
Buttocks	4.22	4.12	4.09	4.02	3.83	1.326	.260
Thighs	4.47	4.20	4.14	3.93	3.91	4.766	.001***
Legs	4.27	4.07	3.79	3.97	4.00	2.602	.036*
Calf	4.25	4.04	3.81	3.86	4.11	2.960	.020*
Knee	4.40	3.98	3.80	3.93	3.93	4.274	.002**
Weight	3.84	3.78	3.69	3.72	3.83	.220	.972
Height	4.11	4.00	3.85	3.84	4.22	1.391	.237

*p≤0.05, **p≤0.01, *** p≤0.001

A post hoc test showed significant difference for knee within the groups who always wear trousers without pleats and those who sometimes wear them (p≤0.001). For legs, the difference was shown within those who never wear trousers without pleats and those who rarely wear them (p≤0.05). The significant difference for calf was shown within those who always wear trousers without pleats and those who sometimes wear them (p≤0.05) and lastly for thigh within those who never wear trousers without pleats and those who always wear them (p≤0.05). The results showed that respondents who were satisfied with their knee, calf, legs and thighs wear trousers without pleats.

Full Skirts

The results from ANOVA test showed significant difference in the waist (F=4.837, p≤0.001), legs (F= 3576, p≤0.01) abdomen (F=3.124, p≤0.05) and knee (F=2.485, p≤0.05) as shown in Table 7.19.

Table 7.19: Results of ANOVA Test on Full Skirt

Variables	Mean Scores of Clothing Choice (Full Skirt)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Waist	4.40	4.06	4.07	3.60	4.03	4.837	.001***
Abdomen	3.63	3.56	3.71	3.08	3.56	3.124	.015*
Hip	4.33	4.15	4.20	4.38	4.38	1.097	.358
Buttocks	4.10	4.04	4.01	4.25	4.08	.757	.554
Thighs	4.29	4.13	4.15	4.14	4.05	.478	.752
Legs	4.35	3.95	4.11	3.71	3.85	3.576	.007**
Calf	4.33	3.91	3.97	3.97	3.97	1.941	.103
Knee	4.17	3.89	4.14	3.75	4.00	2.485	.043*
Weight	4.00	3.64	3.80	3.67	3.82	1.032	.390
Height	4.23	3.86	4.02	3.95	3.92	.986	.415

*p≤0.05, **p ≤0.01, *** p ≤0.001

A post hoc test showed significant difference in waist within the groups who rarely wear full skirt and those who never them (p≤0.001) and those who sometimes wear them (p≤0.05). The test revealed that for abdomen, there was some significant difference within those who rarely wear full skirt and those who sometimes wear them (p≤0.05). For legs, the difference was shown within those who rarely wear full skirt and those who always wear them (p≤0.05). There was no difference within groups for knee. The results showed that those who were satisfied with their waist, legs, abdomen and knee wear full skirt.

Skirts above the Knee

The results from ANOVA test showed significant difference in the thighs (F=4.791, p≤0.001), waist (F=3.360, p≤0.05), abdomen (F=2.602, p≤0.05), legs (F=2783, p≤0.05) and calf (F=2.930, p≤0.05) as shown in Table 7.20.

Table 7.20: Results of ANOVA Test on Skirt above the Knee

Variables	Mean Score of Clothing Choice (Skirt Above the Knee)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Waist	4.31	4.02	4.11	3.98	3.61	3.360	.010*
Abdomen	3.54	3.75	3.61	3.22	3.26	2.602	.036*
Hip	4.58	4.25	4.23	4.36	3.87	4.206	.002**
Buttocks	4.19	4.14	4.12	4.05	3.74	1.815	.125
Thighs	4.46	4.19	4.21	4.07	3.74	4.791	.001***
Legs	4.42	3.98	4.02	3.83	3.87	2.783	.027*
Calf	4.42	3.93	3.93	3.97	4.00	2.930	.021*
Knee	4.08	4.12	3.89	3.93	3.98	.941	.440
Weight	3.92	3.75	3.87	3.74	3.43	1.467	.212
Height	4.21	4.08	3.87	4.02	3.80	1.409	.230

*p≤0.05, ** p≤0.01, ***p ≤0.001

A post hoc test showed significant difference for hip within those who never skirt above the knee and those who always wear them (p≤0.01). For thigh, it was shown within those who never wear skirt above the knee and those who always or sometimes wear them (p≤0.05). It indicated significant differences for calf within groups who sometimes wear skirt above the knee and those who always wear them (p≤0.05). The results showed significant difference for abdomen within the groups who always wear skirt above the knee and those who most of the time or sometimes wear them (p≤0.05). For waist, the difference was shown within those who never wear skirt above the knee and those who always wear them (p≤0.05). There was no significant difference within groups for satisfaction of legs. The result showed that respondents who were satisfied with their waist, abdomen, thighs,

legs and calf always, or most of time or sometimes wear skirt above the knee than respondents were not satisfied with these areas of the body.

Clothes with Dark coloured Fabric

The results from ANOVA test showed significant difference in waist (F= 3.681, p≤0.01), calf (F=3.709, p≤0.01), arm (F=3.215, p≤0.05), thighs (F=3.351, p≤0.05) and overall appearance (F=2.699, p≤0.05) as shown in Table 7.21.

Table 7.21: Results of ANOVA Test Dark Coloured Fabric

Variables	Mean Score of Clothing Choice (Dark coloured Fabric)					F=Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.26	4.39	4.39	4.38	4.51	.407	.804
Shoulder	4.17	4.17	4.22	4.06	4.43	1.240	.294
Arm	4.30	4.10	4.01	4.01	4.57	3.215	.013*
Bust	4.26	3.92	4.06	4.29	4.31	2.027	.090
Waist	4.17	3.93	3.86	4.32	4.09	3.681	.006**
Abdomen	3.57	3.51	3.46	3.75	3.37	1.079	.367
Hip	4.48	4.10	4.21	4.26	4.60	2.295	.059
Buttocks	4.17	4.22	4.02	3.95	4.40	1.988	.096
Thighs	3.78	4.14	4.12	4.15	4.57	3.351	.010*
Legs	3.87	3.98	3.98	4.02	4.29	.846	.497
Calf	3.65	3.92	4.05	3.89	4.46	3.709	.006**
Knee	4.00	3.86	4.01	3.96	4.46	1.242	.293
Weight	3.78	3.69	3.65	3.86	4.31	2.041	.088
Height	4.22	3.81	3.96	4.00	4.20	1.119	.347
Overall Appearance	4.04	4.10	4.33	4.17	4.23	2.699	.031*

p≤0.05, ** p≤0.01, ***p ≤0.001

The post hoc test showed significant difference for waist within those who wear dark coloured fabric most of the time and those who sometimes wear them (p≤0.05), for calf the difference was shown within those who wear dark coloured clothes always and those who most of the time or those who never wear them (p≤0.05). For thigh, the difference was shown between those who never wear clothes with dark coloured fabric and those who always wear them (p≤0.05). In terms of the arm, the difference was shown within those who sometimes wear clothes with dark coloured fabric and those who always wear them (p≤0.05). There was no significant difference within the groups for the overall appearance. The results showed that those who were satisfied with their arm, waist, thigh and calf did not wear clothes with dark coloured fabrics.

Clothes with Bright Coloured Fabrics

The results from ANOVA test showed significant difference between buttocks (F=4.739, p≤0.001), overall appearance (2.699, p≤0.001), knee (F=3.406, p≤0.01), knee (F=3.406, p≤0.01), shoulder (F=2.426, p≤0.05), arm (F=3.215, p≤0.05) and waist (F=3.188, p≤0.05), as shown in Table 7.22.

Table 7.22: Results of ANOVA Test on Clothes with Bright Coloured Fabric

Variables	Mean Scores of Clothing Choice (Bright coloured Fabric)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.26	4.47	4.42	4.40	4.18	1.306	.267
Shoulder	4.27	4.30	4.15	3.80	3.91	2426	.048*
Arm	4.14	4.14	4.15	3.52	4.18	3215	.031*
Bust	4.30	4.23	3.96	3.84	4.27	2567	.038*
Waist	4.18	4.16	3.88	3.60	3.82	3148	.014*
Abdomen	3.74	3.59	3.52	3.04	3.00	2.255	.063
Hip	4.35	4.34	4.10	4.12	4.36	1.653	.160
Buttocks	4.09	4.30	3.89	3.68	3.82	4.739	.001***
Thighs	4.18	4.26	4.06	4.08	3.91	1.210	.306
Legs	3.96	4.11	4.03	3.48	4.09	2.269	.061
Calf	4.04	4.07	4.02	3.56	3.91	1.752	.138
Knee	4.14	4.07	3.96	3.36	4.09	3.406	.009**
Weight	3.81	3.80	3.75	3.64	3.73	2.041	.088
Height	4.24	3.95	3.87	3.96	4.09	1.119	.213
Overall Appearance	4.39	4.39	4.14	3.68	4.55	2.699	.000***

*p≤0.05, ** p≤0.01, ***p ≤0.001

The post hoc Scheffe test indicated significant difference in buttocks within the groups, who rarely wear clothes with bright coloured fabric and those who always wear them (p≤0.05). In terms of knee, the significance difference was shown within the groups, who rarely wear clothes with bright coloured fabric and those who wear them most of the time or always (p≤0.05). For arms, the difference was shown within the groups, who rarely wear them and those who wear them most of the time (p≤0.05) and finally those who rarely wear them and those who sometimes wear them (p≤0.05). For the overall appearance (p≤0.05), the difference was shown within the groups who rarely wear clothes with bright coloured fabric and those who wear them most of the time (p≤0.01). In the case of the knee, the difference was shown within those who rarely wear clothes with bright coloured fabric and those who wear them always or most of the time (p≤0.05).

The results showed that satisfaction for their shoulder arm, bust waist, buttocks, and knee wear clothes with bright colour fabric always or most of the time but

those who were not satisfied with the overall appearance rarely wear clothes with bright colours.

Clothes with Plain Coloured Fabric

The results from ANOVA test showed significant difference between shoulder (F=4.267, p≤0.01), buttocks (F=3.622, p≤0.01), arm (F=2.536, p≤0.05) and overall appearance (F=3.207, p≤0.05) as shown in Table 7.23.

Table 7.23: Results of ANOVA Test on Plain Coloured Fabric

Variables	Mean Scores of Clothing Choice (Plain Fabric)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.31	4.47	4.37	4.43	4.09	1.799	.128
Shoulder	4.33	4.27	4.17	4.03	3.27	4.267	.002**
Arm	4.30	4.12	4.08	3.89	3.45	2.536	.040*
Bust	4.44	4.07	4.07	4.16	3.73	2.349	.054
Waist	4.16	4.04	4.00	3.97	3.64	.785	.536
Abdomen	3.66	3.63	3.50	3.30	2.91	1.512	.198
Hip	4.51	4.24	4.20	4.16	3.91	1.923	.106
Buttocks	4.18	4.08	4.05	4.27	3.09	3.622	.007**
Thighs	4.38	4.09	4.20	4.05	3.55	.892	.469
Legs	4.23	3.97	3.96	4.00	4.00	2.269	.061
Calf	4.15	4.01	4.03	3.73	3.64	1.709	.147
Knee	4.13	4.05	4.01	3.73	3.36	2.293	.059
Weight	3.85	3.77	3.79	3.59	3.73	.317	.866
Height	4.21	4.03	3.93	3.73	3.55	1.799	.128
Overall Appearance	4.38	4.36	4.22	4.06	3.55	3.207	.013*

*p≤0.05, ** p≤0.01, ***p ≤0.001

The test showed significant difference for shoulder within groups, who never wear clothes with plain coloured fabric and those who sometimes wear them (p≤0.05). For buttocks, the difference was shown within all groups (p≤0.05). There was no significant difference within the groups for overall appearance and arms. The results showed that respondents who were satisfied with their buttocks wear clothes with plain coloured fabric always, sometimes or most of the time than those who were less satisfied with their buttocks.

Clothes with Textured or Patterned Clothes

The results from ANOVA test showed significant difference for waist (F=5.190, p≤0.001), overall appearance (F= 4.74, p≤0.001), shoulder (F= 3.416, p≤0.01), bust (F=3.527, p≤0.01), abdomen (F=4.458, p≤0.01), neck (F=2.635, p≤0.05), legs (F=2.660, p≤0.05), weight (F=3.741, p≤0.05), and knee (F=2.660, p≤0.05) as shown in Table 7.24.

Table 7.24: Results of ANOVA Test for Textured or Patterned Clothes

Variables	Mean Score of Clothing Choice (Textured or Patterned Clothes)					F-Value	P
	Always	Most of the time	Sometimes	Rarely	Never		
Neck	4.48	4.41	4.38	4.11	4.90	2.635	.034*
Shoulder	4.43	4.18	4.20	3.77	4.40	3.416	.009**
Arm	4.31	4.07	4.06	3.91	4.30	1.315	.264
Bust	4.40	3.28	3.98	3.86	4.10	3.527	.008**
Waist	4.26	4.19	3.95	3.71	3.10	5.190	.000***
Abdomen	3.88	3.67	3.46	3.11	2.60	4.458	.002**
Hip	4.38	4.36	4.18	3.97	4.30	1.879	.113
Buttocks	4.08	4.20	4.01	3.91	3.80	1.248	.290
Thighs	4.34	4.22	4.10	3.97	3.70	2.221	.066
Legs	4.26	4.07	3.98	3.69	3.50	2.660	.033*
Calf	4.28	3.96	3.98	3.94	3.50	2.220	.066
Knee	4.14	3.98	4.04	3.91	3.10	2.589	.037*
Weight	4.00	3.81	3.81	3.31	2.90	3.740	.005**
Height	4.17	4.12	3.88	3.74	3.60	2.064	.085
Overall Appearance	4.44	4.26	4.25	4.03	3.30	4.741	.001***

*p≤0.05, ** p≤0.01, ***p ≤0.001

A post hoc scheffe test revealed for waist there was significant difference within those who never wear clothes with patterned or textured fabrics and those who wear them most of the time or always (p≤0.05). For the abdomen, the difference was shown within groups who never wear them and those who always wear them (p≤0.05). In terms of the knee the difference were shown within those who never wear them and those who always wear them (p≤0.05). For the shoulder, the difference was shown within those who never wear clothes with patterned and textured fabrics and those who always wear them (p≤0.05). The test indicated no significant difference in overall appearance. The results showed that those who were satisfied with their shoulder, bust, waist, knee and abdomen wear clothes with textured or patterned clothes.

7.11 Clothing Choice

Clothing types used for the evaluation of clothing choice ranged from looseness to fitness of dresses, shirts and blouses, short, long or sleeveless, trousers with pleats in front, or trousers with flat front, straight or full skirts above or below knee length, clothes with dark or bright coloured fabrics and clothes with patterned or textured fabrics.

7.11.1 Descriptive Statistics of Clothing Choice

Respondents were asked to rate variety of clothing items. A five-point Likert scale with the following choices was used: always, most of the time, sometimes, rarely

and never. For purposes of discussing the clothing behaviour of respondents, the responses for always and most of the time were combined to determine clothing item worn with the most frequency, and the responses of rarely and never were combined to determine clothing item worn with less frequently. This grouping was however not used in the statistical analysis. Clothing items worn most frequently were fitted dresses (53.3%), semi fitted shirts or blouses (64.3%), fitted shirts or blouses (63.6), clothes with bright coloured fabrics (59.3%), clothes with plain fabrics (55.1%). Clothing item worn less frequently was trousers with pleats in front (60.1%). The percentages of frequencies with which respondents indicated preference for clothing items are shown in Table 7.25. The summary distribution of responses for all clothing choice given by respondents is presented in Table 7.26.

Table 7.25: Frequency with which Respondents wear Clothing items

Clothing items	Clothes Worn most Frequently (%)	Clothes Worn Sometimes %	Clothes Worn Less Frequently (%)
Loosely Fitted Dresses	39.3	42.3	18.6
Semi Fitted Dresses	49.8	40.9	9.2
Fitted Dresses	53.3	28.6	16.5
Long Length Dresses	40.0	38.1	20.0
Short Length Dresses	43.0	33.3	23.6
Loosely Fitted Shirts/ Blouses	35.9	40.2	23.4
Semi Fitted Shirts/Blouses	64.3	26.0	9.2
Fitted Shirt or Blouses	63.6	24.7	11.8
Long Sleeved Shirts/Blouses	33.9	39.6	26.5
Short Sleeve Shirts/Blouses	43.1	33.3	23.6
Sleeveless Shirts or Blouses	45.9	27.8	25.8
Trousers with Pleats in Front	19.4	20.5	60.1
Trousers with Flat Front	47.5	20.5	33.9
Straight Skirts	35.4	37.0	27.1
Full Skirts	37.8	34.9	26.7
Skirts Above Knee Length	42.8	29.7	27.3
Skirts below Knee Length	45.7	37.0	17.3
Clothes with DC Fabrics	33.9	44.6	21.5
Clothes with BC Fabrics	59.3	30.7	9.5
Clothes with Plain Fabrics	55.1	32.0	12.6
Clothes with P/T Fabrics	47.5	40.4	11.8

n=381
(P/T Patterned /Textured)

Table 7.26: Frequency indicating Respondents Clothing Choices

Clothing Items	Always		Most of the Time		Sometimes		Rarely		Never		Not Responded		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Loosely Fitted Dresses	66	17.3	83	21.8	161	42.3	47	12.3	24	6.3	0	0.0	381	100
Semi Fitted Dresses	44	11.5	146	38.3	156	40.9	26	6.8	9	2.4	0	0.0	381	100
Fitted Dresses	109	28.6	98	25.7	109	28.6	37	9.7	26	6.8	2	0.5	381	100
Long Length Dresses	73	19.2	87	22.8	145	38.1	49	12.9	27	7.1	0	0.0	381	100
Short Length Dresses	57	15.0	107	28.1	127	33.3	59	15.5	31	8.1	0	0.0	381	100
Loosely Fitted Shirts or Blouses	47	12.3	90	23.6	153	40.2	59	15.5	30	7.9	2	0.5	381	100
Semi Fitted Shirt or Blouses	91	23.9	154	40.4	99	26.0	24	6.3	11	2.9	2	0.5	381	100
Fitted Shirt or Blouses	105	27.6	137	36.0	94	24.7	27	7.1	18	4.7	0	0.0	381	100
Long Sleeved Shirt or Blouses	40	10.5	89	23.4	151	39.6	74	19.4	27	7.1	0	0.0	381	100
Short Sleeved Shirts/ Blouses	57	15.0	107	28.1	127	33.3	59	15.5	31	8.1	0	0.0	381	100
Sleeveless Shirts or Blouses	64	16.8	111	29.1	106	27.8	57	15.0	41	10. 8	2	0.5	381	100
Trousers with Pleats in Front	21	5.5	53	13.9	78	20.5	83	21.8	14.6	38.3	0	0.0	381	100
Trousers with Flat Front	73	19.2	108	28.3	78	20.5	83	21.8	46	12.1	0	0.0	381	100
Straight Skirt	45	11.8	90	23.6	141	37.0	62	16.3	41	10.8	2	0.5	381	100
Full Skirts	48	12.6	96	25.2	133	34.9	63	16.5	39	10.2	2	0.5	381	100
Skirts below Knee Length	48	12.6	115	30.2	113	29.7	58	15.2	46	12.1	1	0.3	381	100
Skirts below Knee Length	56	14.7	118	31.0	141	37.0	37	9.7	29	7.6	0	0.0	381	100
Clothes with Dark Coloured Fabrics	35	9.2	94	24.7	170	44.6	59	15.5	23	6.0	0	0.0	381	100
Clothes with Bright Coloured Fabrics	74	19.4	152	39.9	117	30.7	25	6.6	11	2.9	2	0.5	381	100
Clothes with Plain Fabrics	61	16.0	149	39.1	122	32.0	37	9.7	11	2.9	1	0.3	381	100
Clothes with P/T Fabrics	58	15.2	123	32.3	154	40.4	35	9.2	10	2.6	1	0.3	381	100
Traditional clothes	83	21.8	108	28.3	143	37.5	36	9.4	10	2.6	1	0.3	381	100
Ready-to-wear clothes	102	26.8	138	36.2	99	26.0	27	7.1	27	7.1	0	0.0	381	100

(n=381)

7.11.2 Relationship between Clothing Choice and Demographic Factors

One-way analysis of variance (ANOVA) was used to determine the relationship between clothing choice and demographic factors. This was to determine the significant difference between the demographic factors and clothing choice.

Age and Clothing Choice

ANOVA Results showed that there were relationships between age and skirts above knee length (F=8.706, p≤0.001), clothes with plain fabrics (F=4.400, p≤0.01), clothes with bright coloured fabrics (F= 4.072, p≤0.01), loosely fitted dresses (F=4.105, p≤0.01) and short length dresses (F= 3.327, p≤0.05), as shown in Table 7.27.

Table 7.27: Results of ANOVA test on Clothing Choice and Age

Variable	Mean Scores of Age Groups				F-Value	P
	18-22	23-27	28-31	32-35		
Loosely Fitted Dresses	3.07	3.20	3.62	3.43	4.105	.007**
Semi Fitted Dresses	3.38	3.55	3.51	3.51	.650	.583
Fitted Dresses	3.70	3.71	3.34	3.56	1.665	.174
Long Length Dresses	3.36	3.35	3.22	3.39	.355	.786
Short Length Dresses	3.31	3.45	3.30	2.99	3.327	.020*
Loosely Fitted S/Blouses	2.99	3.13	3.29	3.28	1.417	.238
Semi Fitted Shirt or Blouses	3.53	3.98	3.62	3.76	.568	.636
Fitted Shirt or Blouses	3.81	3.78	3.62	3.74	.432	.731
Long Sleeved Shirt or Blouse	2.91	3.16	3.33	3.05	1.756	.155
Short sleeve Shirts or Blouses	3.53	3.98	3.76	3.77	4.165	.006**
Sleeveless Shirts or Blouses	3.32	3.27	3.38	3.15	.608	.610
Trousers with Pleats in Front	2.05	2.23	2.35	2.40	1.265	.286
Trousers with Flat Front	3.19	3.51	3.20	3.10	2.372	.070
Straight Skirt	2.79	3.17	3.25	3.11	2.319	.075
Full Skirts	3.07	3.13	3.39	3.03	1.554	.200
Skirts Above Knee Length	3.23	3.51	3.10	2.74	8.706	.000***
Skirts below Knee Length	3.26	3.47	3.28	3.34	.805	.492
Clothes with DC Fabrics	2.91	3.28	3.16	3.17	2.276	.079
Clothes with BC Fabrics	3.62	3.87	3.71	3.44	4.072	.007**
Clothes with Plain Fabrics	3.34	3.78	3.38	3.55	4.400	.005**
Clothes with P/T Fabrics	3.46	3.65	3.44	3.34	2.256	.081

* p≤0.05, ** p≤0.01 *** p≤0.001

(D/C-Dark Coloured, BC-Bright coloured, P/T Patterned /Textured)

A post hoc test showed significant difference between the age group for the following clothing items; short length dresses within groups 23-27 and 32-35 (p≤0.05), for the skirt above the knee the difference was within groups 23-27 and 32-35 (p≤0.001) and for clothes with plain fabrics the difference was shown within ages 18-22 and 23-27 (p≤0.05). For loosely fitted dresses, the difference was seen within 18-22 and 28-31, clothes with bright coloured fabric 23-27 and 32-35 and

short sleeved shirt and blouse 18-22 and 23-27. The results showed that respondents who were older preferred wearing loosely fitted dresses, short sleeved shirt and blouse and clothes with plain coloured fabrics but the younger respondents preferred wearing short length dresses, skirt above the knee and clothes with bright coloured fabric.

Occupation and Clothing Choice

The ANOVA results showed there were difference between occupation and loosely fitted dresses (F= 5.309, p≤0.001), skirts above knee length (F=2.583, p≤0.05) and clothes with plain fabrics (F=2.510, p≤0.05) as shown in Table 7.28.

Table 7.28: Results ANOVA test on Clothing Choice and Occupation

Variable	Mean Scores of Occupational Groups					F-Value	P
	Students	/Office ClerkSecretary	womenBusiness	Professional	Other s		
Loosely Fitted Dresses	3.23	3.40	4.06	3.14	3.53	5.309	.000***
Semi Fitted Dresses	3.51	3.24	3.73	3.39	3.67	1.765	.135
Fitted Dresses	3.65	3.32	3.82	3.57	3.30	1.206	.308
Long Length Dresses	3.37	3.20	3.64	3.18	3.40	1.153	.331
Short length Dresses	3.34	3.44	3.21	2.96	3.50	2.199	.069
Loosely fitted S/ Blouses	3.14	3.20	3.36	3.18	3.14	.313	.869
Semi fitted S/Blouses	3.58	3.32	3.64	3.47	3.90	1.668	.157
Fitted Shirts or Blouses	3.82	3.64	3.70	3.61	3.73	.661	.620
Long sleeved S/Blouses	3.07	3.24	3.24	3.00	3.40	1.081	.366
Short sleeve S /Blouses	3.78	3.68	3.73	3.73	3.87	.187	.945
Sleeveless Shirts/Blouses	3.34	3.12	3.21	3.20	3.10	.493	.741
Trousers with Pleats Front	2.22	2.52	2.18	2.29	2.40	.468	.759
Trousers with Flat Front	3.32	3.52	3.06	3.26	3.03	.800	.526
Straight Skirts	3.06	2.76	3.58	3.07	3.17	2.119	.078
Full Skirts	3.12	3.20	3.12	3.13	3.23	.089	.986
Skirts Above Knee Length	3.25	3.24	3.20	2.80	3.34	2.583	.037*
Skirts below Knee Length	3.38	2.96	3.33	3.39	3.40	.903	.462
Clothes with DC Fabrics	3.13	3.28	3.2	3.08	3.37	.610	.656
Clothes with BC Fabrics	3.75	3.52	3.63	3.44	3.90	2.190	.070
Clothes with Plain Fabrics	3.49	3.84	3.67	3.45	3.97	2.510	.042*
Clothes with P/T Fabrics	3.51	3.72	3.24	3.43	3.50	1.050	.381

* p≤0.05, ** p≤0.01, *** p≤0.001

A post hoc test revealed significant differences between occupational groups and some of the clothing items. For loosely fitted dresses, there was significant difference within students and businesswomen (p≤0.05). For skirts above knee, the difference was shown within secretary and students (p≤0.05) and business women and secretary groups (p≤0.05). The test however did not show any significance difference within the groups for clothes with plain fabrics. The results

showed that businesswomen wore loosely fitted dresses more than any of the occupational groups. The students and secretary groups wore skirt above the knee length more than businesswomen.

Education and Clothing Choice

The ANOVA test results indicated significant difference between educational groups and clothes with patterned or textured fabrics (F=4.337, p≤0.001), loosely fitted dresses (F=3.592, p≤0.01), clothes with plain fabric (3.607, p≤0.01) and fitted dresses (F=2.656, p≤0.05), as shown in Table 7.29.

Table 7.29: Results of ANOVA Test for Educational groups

Variable	Mean Scores of Educational Group					F-Value	P
	Junior/ Senior Sec	& ComTech, Voc	Polytechnic	University	Others		
Loosely Fitted Dresses	3.39	3.78	3.11	3.45	3.06	3.592	.007**
Semi Fitted Dresses	3.63	3.63	3.46	3.43	3.47	.779	.539
Fitted Dresses	3.54	3.28	3.70	3.48	4.29	2.656	.033*
Long Length Dresses	3.47	3.38	3.23	3.40	3.35	.649	.628
Short Length Dresses	3.13	3.44	3.30	3.18	3.71	1.263	.284
Loosely Fitted ST/BL	3.20	3.61	3.05	3.23	2.94	2.027	.090
Semi Fitted S/Blouses	3.49	3.94	3.49	3.61	3.71	1.818	.125
Fitted Shirt or Blouses	3.66	3.47	3.89	3.64	4.06	1.933	.104
Long Sleeved SH/BL	3.26	3.09	2.99	3.14	3.35	1.036	.389
Short Sleeved SH/BL	3.76	3.66	3.74	3.77	4.12	.664	.617
Sleeveless S/Blouses	3.07	3.38	3.37	3.19	3.41	.925	.450
Trousers with Pleats	2.21	2.28	2.28	2.26	2.29	.041	.997
Trousers with Flat Front	3.20	3.13	3.43	3.23	2.82	1.286	.275
Straight Skirts	2.87	3.25	3.14	3.11	3.24	.943	.439
Full Skirts	2.99	3.22	3.15	3.19	3.06	.428	.789
Skirts Above Knee	3.23	3.13	3.25	3.00	3.18	.784	.536
Skirts below Knee	3.43	3.28	3.38	3.31	3.24	.250	.909
Clothes with DC Fabrics	3.11	2.97	3.24	3.13	3.12	.602	.661
Clothes with BC Fabrics	3.64	3.81	3.72	3.57	3.65	.588	.672
Clothes with PL fabrics	3.26	3.25	3.63	3.73	3.59	3.607	.007**
Clothes with P/T Fabrics	3.26	3.19	3.53	3.54	4.18	4.337	.002***

*p≤0.05, **p≤0.01, *** p≤0.001

A post hoc test revealed that there were significant differences within respondents who have technical, vocational & commercial qualifications and polytechnic qualification (p≤0.05) for loosely fitted dresses, for clothes with patterned or textured fabrics the difference was shown within those with junior/ senior secondary qualifications and other qualifications (p≤0.05). For clothes with plain

fabric the difference was shown within those with junior/ senior secondary qualifications and those with other qualifications. The results showed that respondents who had technical, vocational & commercial qualifications wore loosely fitted dresses more frequently and clothes with patterned or textured fabrics with less frequently and versa visa for those with polytechnic qualification.

7.11.3 Clothing Choice and Body Cathexis

One-way analysis of variance (ANOVA) was used to determine the relationship between clothing choice and body cathexis. The satisfaction of body cathexis was determined using specific clothing types.

Satisfaction with Waist

ANOVA test results indicated significant difference between the waist and straight skirts (F=3.725, p≤0.01), trousers with pleats in front (F=2.858, p≤0.05) and as shown in Table 7.30.

Table 7.30: Results of ANOVA Test Satisfaction with Waist

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very Dissatisfied		
Trousers with Pleats in Front	2.21	2.18	2.86	2.12	2.50	2.858	.023*
Trousers with Flat Front	3.28	3.28	3.38	3.19	2.00	.620	.649
Straight skirts	3.14	3.16	3.33	2.50	2.50	3.725	.005**
Full skirts	3.32	3.11	2.93	2.79	3.00	2.317	.057

*p ≤0.05**p≤0.01, *** p≤0.001

Post hoc test indicated significant difference for waist within those who were satisfied and those who neither were satisfied nor dissatisfied with wearing trousers with pleats in front (p≤0.05). For the straight skirt there were significant difference within those who were dissatisfied and neither satisfied nor dissatisfied (p≤0.05) with those who were satisfied with wearing them (p≤0.05) there were differences between those who were dissatisfied and those who were very satisfied with straight skirt (p≤0.05). The results showed that respondents who were dissatisfied with their waist do wear trousers with pleats in front and those who were satisfied with their waist wore straight skirt.

Satisfaction with Abdomen

ANOVA test results indicated statistically significant difference between the abdomen and fitted dresses (F= 4, 446, p≤0.01) as shown in Table 7.31.

Table 7.31: Results of ANOVA Test on Satisfaction with Abdomen

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very Dissatisfied		
Trousers with Pleats in Front	2.09	2.37	2.21	2.39	2.12	.939	.441
Trousers with Flat Front	3.41	3.27	3.11	3.13	3.65	1.278	.278
Loosely Fitted Dresses	3.42	3.29	3.25	3.34	3.15	.425	.791
Semi Fitted Dresses	3.56	3.51	3.46	3.48	3.35	.345	.847
Fitted Dresses	3.54	3.90	3.48	3.28	3.19	4.446	.002**
Straight skirts	3.17	3.23	3.02	2.77	2.96	2.055	.086
Full skirts	3.30	3.15	2.94	3.13	3.00	.989	.413

*p ≤0.05, **p≤0.01, ***p≤0.001

Post hoc test indicated significant difference for the abdomen between those who were satisfied with wearing of fitted dresses and those who were dissatisfied with them (p≤0.05). The result showed that those who were satisfied with their abdomen wear fitted dresses.

Satisfaction with Thighs

ANOVA test results indicated statistically significant difference between the thigh and trousers with flat front (F=6.136, p≤0.001), fitted dresses (F=5.604, p≤0.001) and loosely fitted dresses (F=2.539, p≤0.05) as shown in Table 7.32. Post hoc test indicated significant difference for thigh within those who were dissatisfied and those who were satisfied and very satisfied with trousers with flat front (p≤0.05). There were differences between those who were neither satisfied nor dissatisfied (p≤0.01) and those who were satisfied or very satisfied with wearing of fitted dresses (p≤0.01). The result showed that respondents who were satisfied with their thigh wore fitted dresses and trouser with flat front.

Table 7.32: Results of ANOVA Test on Satisfaction with Thighs

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very dissatisfied		
Trousers with Pleats in Front	2.10	2.31	2.57	2.32	3.00	1.601	.173
Trousers with Flat Front	3.40	3.39	2.85	.249	1.50	6.136	.000***
Loosely Fitted Dresses	3.27	3.26	3.65	3.22	5.00	2.539	.040*
Semi Fitted Dresses	3.58	3.46	3.43	3.44	2.50	1.144	.336
Fitted Dresses	3.77	3.54	3.76	2.50	2.50	5.604	.000***
Straight skirts	3.22	3.10	2.91	2.56	2.50	1.843	.120
Full skirts	3.19	3.16	2.85	3.11	3.50	.850	.494

*p ≤0.05, ** p≤0.01, *** p≤0.001

Satisfaction with Weight

ANOVA test results indicated significant difference between weight and fitted dresses (F=2.479, p≤0.05) and clothes with patterned/textured fabrics (F=3.003, p≤0.05) as shown in Table 7.33.

Table 7.33: Results of ANOVA Test on Satisfaction with Weight

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor dissatisfied	Dissatisfied	Very dissatisfied		
Loosely Fitted Dresses	3.35	3.35	3.14	3.30	3.67	.854	.492
Semi Fitted Dresses	3.48	3.55	3..60	3.26	3.50	1.317	.263
Fitted Dresses	3.70	3.56	3.82	3.26	3.08	2.479	.044*
Loosely Fitted S/Blouses	3.18	3.17	3.14	3.36	2.50	1.554	.186
Semi Fitted Shirt/Blouses	3.53	6.63	3.53	3.64	3.50	.267	.899
Fitted Shirt or Blouses	3.70	3.56	3.82	3.26	3.08	.584	.675
Clothes with DC Fabrics	3.33	3.08	3.13	3.04	2.92	1.451	.675
Clothes with BC Fabrics	3.72	3.61	3.66	3.67	3.58	.198	.939
Clothes with Plain Fabrics	3.60	3.52	3.68	3.52	3.08	1.113	.350
Clothes with P/T Fabrics	3.63	3.52	3.48	3.12	3.17	3.003	.018*

*p ≤0.05, ** p≤0.01, *** p≤0.001

Post hoc test indicated significant difference for weight within those who were dissatisfied when they wear patterned or textured fabric and those who were very

satisfied when they wear them (p≤0.05). The results showed that those who were satisfied with their weight wear fitted dresses and fabrics with textures or patterns.

Satisfaction with Height

ANOVA test results indicated significant difference between height and long sleeved shirt / blouses (F=6.311, p≤0.001) as shown in Table 7.34

Table 7.34: Results of ANOVA Test on Satisfaction with Height

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied nor dissatisfied	Dissatisfied	Very dissatisfied		
Long Sleeved S/ Blouses	3.21	3.28	2.88	2.71	2.00	6.311	.000***
Short Sleeved S/ Blouses	3.77	3.78	3.40	3.40	4.09	1.629	.166
Long Length Dresses	3.46	3.35	3.23	3.09	2.91	1.379	.240
Short Length Dresses	3.24	3.43	3.06	2.97	3.45	1.811	.126
Skirts Above Knee Length	3.19	3.30	3.00	2.91	2.64	1.623	.168
Skirts Below Knee Length	3.35	3.40	3.44	3.14	3.18	.542	.705

*p ≤0.05, **p≤0.01, *** p≤0.001

Post hoc test indicated significant difference for height for those who were dissatisfied and those who were satisfied with long sleeved shirt or blouses (p≤0.05), those who were very dissatisfied and very satisfied with long sleeved shirt and blouses (p≤0.05). The result showed that those who were satisfied with their height wear long sleeved shirt and blouses.

Satisfaction with Overall Appearance

ANOVA test results indicated significant difference between overall appearance and clothes with patterned/textured fabrics (F=5.487, p≤0.001), long sleeved shirt/blouses (F=4.020, p≤0.01). the others are clothes with plain fabrics (F=4.777,p≤0.01), loosely fitted shirt/ blouses(F=4.448, p≤0.01), sleeveless shirt/blouses (F=2.568,p≤0.05), short sleeved shirt/blouses (F=3.202, p≤0.05), clothes with bright coloured fabrics (F=3.003, p≤0.05), clothes with dark coloured fabrics (F=2.413,p≤0.05), and fitted dresses (F=2.892, p≤0.05) as shown in Table 7.35.

Table 7.35: Results of ANOVA on Satisfaction with Overall Appearance

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very dissatisfied		
Loosely Fitted Dresses	3.32	3.23	3.53	3.13	4.50	1.895	.111
Semi Fitted Dresses	3.48	3.53	3.35	3.56	2.25	1.762	.951
Fitted Dresses	3.75	3.60	3.11	3.25	3.00	2.892	.022*
Loosely Fitted Shirt/ Blouses	3.21	3.18	3.22	2.94	1.00	4.448	.002**
Semi Fitted Shirt/Blouses	3.62	3.57	3.53	3.31	3.00	.806	.522
Fitted Shirt or Blouses	3.86	3.74	3.45	3.31	3.75	1.866	.116
Clothes with DC Fabrics	3.19	3.20	3.16	2.44	2.75	2.413	.049*
Clothes with BC Fabrics	3.82	3.53	3.65	3.47	2.75	3.003	.018*
Clothes with Plain Fabrics	3.65	3.54	3.68	2.75	2.50	4.777	.001**
Clothes with P/T Fabrics	3.59	3.44	3.54	2.69	2.25	5.487	000***
Short Sleeved Shirt/Blouses	3.87	3.71	3.76	3.69	2.00	3.202	.013*
Long Sleeved Shirt/Blouses	3.26	3.04	3.08	2.50	2.25	4.020	.003**
Sleeveless Shirt/Blouses	3.35	3.35	2.95	2.63	2.50	2.568	.038*

*p ≤0.05, **p≤0.01, *** p≤0.001

Post hoc test indicated significant difference for overall appearance for wearing short sleeved shirts or blouses within all the four groups (p≤0.01). A significant difference was show within those who were satisfied and those who were very satisfied (p≤0.05) long sleeved shirt and blouses. There were significant difference within all the four groups for wearing of loosely fitted shirts and blouses (p≤0.01). For clothes with plain coloured fabric, there were differences within those who were satisfied and those who were dissatisfied and neither satisfied nor dissatisfied (p≤0.05). For clothes with patterned or textured fabric, there were significant differences within groups who were satisfied (p≤0.05) and those who were dissatisfied and very dissatisfied (p≤0.01). There was however no significant difference shown within the groups for the other clothing items. The results showed that respondents who were satisfied with their overall appearance wore fitted dresses, fitted shirt and blouses, clothes with bright, plain coloured fabrics and textured or patterned fabric, long sleeved shirt and blouses.

7.12 Body Shape

Body shape was evaluated based on the shapes presented to the respondents. Six body shapes illustrated for the respondents to choose include triangle, inverted triangle, rectangle, hourglass, diamond and rounded.

7.12.1 Descriptive Statistics of Body Shape

Respondents were asked to choose a body shape that describes their bodies from six shapes selected for the study. The majority of respondents indicated higher scores for hourglass shape 48.6% and triangle shape 33.3% showing 81.9%. The other four shapes recorded a minimal percentages each, rectangle 6.0%, diamond shape 4.5%, inverted shape 3.9% and rounded shape 3.7%, a total percentage of 18.1% as shown in Table 7.36.

Table 7.36: Frequency Distribution of Respondents Choice of Body Shapes

Body Shapes	Frequency	Percentage %
Triangle	127	33.3
Inverted triangle	15	3.9
Rectangle	23	6.0
Hourglass	185	48.6
Diamond	17	4.5
Rounded	14	3.7
Total	381	100

n=381

7.12.2 Relationship between Demographic Factors and Body Shape

One-way analysis of variance (ANOVA) was used to determine the relationship between body shape and demographic factors: age, marital, income, education, occupation and childbirth status. The test results showed no significance difference between body shape and the demographic factors. The post hoc Scheffe test was therefore not performed.

7.12.3 Clothing Choice and Body Shape

ANOVA test indicate only one significant difference for clothes with plain fabrics ($F=3.040$, $p<0.05$). The post hoc Scheffe test did not show any significant difference within the groups. Test conducted on body shape and clothing items body cathexis and clothing choice that showed no significant difference as shown in Appendix M.

7.13 Chapter Summary

In this chapter the analysis of data for the focus group discussion and questionnaires for consumers. Topics discussed in the focus group include the perception of body shape and size, description of body shape and size, description of body shape in terms of weight and height. The views of the participants on the ideal body shape and their preference for a particular body shape were also analysed. Participants expressed their views on the effect of body shape and size on body image. Personal influence and the societal influence on body image emerged as the two influences that affect body image. Participants were of the view that the feelings an individual has towards her own body and the perception the society has towards body shape and size can influence her in a positive or a negative way. The relationship between body shape, body cathexis and clothing choice was also established by the participants. Other issues discussed included factors that influence the choice of clothing, limitation of clothing choice and the relationship between body cathexis and clothing choice. The satisfaction and dissatisfaction of body shape and size in relation to ready-to-wear clothing, the individual evaluation of body shapes and sizes in relating to the ideal figure were also discussed. The results indicated that perception of an ideal shape in the African sense may be different from other societies taking into consideration their beliefs and cultural practices. Other issues discussed include the perception about clothing sizing, participants knowledge about clothing sizing and identification of individual clothing size. The final discussions were on Ghanaian clothing industry, developing sizing system for Ghanaians, consumer perception of the local clothing industry and consumer expectation from the local clothing industry. The results indicated that clothing are chosen to complement body shape and derive a degree of satisfaction and good fit. It was also revealed that clothing should be comfortable to wear, have fabrics with suitable patterns and textures, appropriate style and colour, which can flatter the body shape.

For the second part of the chapter, the questionnaires collected from clothing consumers were analysed quantitatively using SPSS One-way analysis of variance (ANOVA). The body cathexis, body shape and clothing choice formed the three main areas of the questionnaire. 5-point Likert scale ranging from very satisfied to very dissatisfied was used for body cathexis to evaluate fifteen body areas. The relationships between demographic factors and body cathexis, body cathexis and clothing choice and body cathexis and body shape were analysed.

Twenty-one different clothing types were chosen for the evaluation. The clothes ranged from long to short dresses, blouses and shirts, long sleeve to sleeveless, trousers with pleat and without pleat, long or short, A-line or straight skirts with plain, textured, or patterned fabrics, dark or bright fabrics. Issues analysed included relationship between clothing choice and demographic factors, clothing choice and body cathexis and clothing choice and body shape. Body shape was evaluated based on the six body shapes. Issues analysed included relationship between body shape and demographic factors, body shape and clothing choice, body shape and body cathexis.

The test revealed statistically significant differences between the body cathexis and some of the demographic factors such as age, marital status, income, childbirth and not for education and occupation. It also established some significant differences between body cathexis and majority of the clothing types and finally with body shape. The results clearly indicated that there were significant differences between clothing choice and all the demographic factors as well as body cathexis but no significant difference were indicated for clothing choice and body shape. It was revealed that there were no significant differences between body shapes and the demographic factors, body cathexis and clothing types.

Chapter 8: Analysis of Anthropometric Data

8.1 Introduction

This chapter presents the analysis of anthropometric body measurements data obtained from 842 Ghanaian women aged 16-35 years. The ages of the women measured were categorised into four age groups as follows; 16-20 years (231), 21-25 years (324), 26-30 years (194) and 30-35 years (93). The processes of converting the body measurements data into size charts are discussed. The descriptive statistics and frequencies variables obtained from the raw data analysis have been presented. Coefficient correlations of the variables were calculated and used to determine and select key dimensions of the study. The development of size chart, determination of size ranges, inter-size intervals and size codes are explained. The lower and upper limits values of measurements, which determined the boundaries of each size codes, are discussed. The addition of ease allowance utilised for specific measurements, pattern configuration, grading of 2D patterns and grading rule tables for the development of garment measurements are discussed. Finally, the size charts are evaluated for fit through fitting trials to validate the data.

8.2 Presentation of Results of the Data

The anthropometric data obtained from this study served as the basis of information for the analysis. According to Kemsley (1957), the usefulness of anthropometric survey will depend on the extent to which these body measurements are transformed by statistical analysis in summaries or key dimensions and used in solving design problems. Descriptive statistical information, such as the mean, median, mode, standard deviation, minimum and maximum values, frequencies and percentiles of the body measurements needed for the analysis were calculated using Statistical Package for Social Sciences (SPSS) version 16. The values were calculated in centimetres with the exception of the weight, which is in kilograms. All values of the standard deviation are rounded to two decimal places. Table 8.1 presents the descriptive statistics for body dimensions.

Table 8.1: Descriptive Statistics for Body Dimensions

Body Dimensions (cm)	Mean	Median	Mode	Standard Deviation	Minimum	Maximum
Height	159.59	160.00	160.00	6.09	142.00	179.40
Weight (Kg)	54.83	53.85	55.00	7.63	40.00	88.00
Neck Girth	34.84	35.00	33.00	1.48	22.50	47.00
Cervical to Waist	37.80	38.00	38.00	2.33	31.00	44.00
Cervical to Ground	138.56	138.50	137.00	4.93	130.00	156.00
Neck to Shoulder point	12.29	12.00	12.00	0.78	10.00	15.00
Back Shoulder Width	39.02	39.00	39.00	2.49	28.50	49.00
Front Neck Point- Bust	25.61	25.50	25.00	2.10	19.00	35.00
Front Neck point - Waist	40.50	40.00	40.00	2.44	33.00	49.00
Arm length	59.22	59.00	59.00	3.01	51.00	69.00
Shoulder Point to Elbow	32.76	33.00	33.00	1.99	23.30	44.00
Upper Arm Girth	27.79	27.50	28.00	2.95	23.00	38.00
Armscye Girth	36.47	36.00	34.00	3.03	23.00	47.00
Elbow Girth	29.64	29.50	28.00	2.52	21.50	43.00
Wrist Girth	15.47	15.50	15.00	0.87	12.70	18.00
Bust Girth	85.53	84.20	82.00	5.64	75.00	101.00
Under Bust Girth	70.03	69.50	69.00	4.72	60.00	98.30
Across Front	32.05	32.00	31.00	2.26	23.00	40.00
Across Back	33.51	33.50	33.00	2.47	24.00	42.00
Side waist to Ankle	99.21	99.00	99.00	4.47	85.00	112.00
Side Waist to Knee	58.62	58.50	58.00	3.12	49.00	69.50
Side Waist to Hip	20.91	20.50	20.00	1.03	16.00	24.70
Waist Girth	67.71	67.00	66.00	5.41	57.00	86.00
Upper Hip Girth	82.06	82.00	83.00	5.88	63.00	101.00
Lower Hip Girth	96.18	95.50	90.00	6.47	78.00	109.00
Thigh Girth	54.97	55.00	52.00	4.44	44.00	68.00
Knee Girth	35.93	36.00	36.00	2.61	23.00	44.00
Calf Girth	33.68	34.00	34.00	2.75	21.00	40.00
Ankle Girth	24.02	24.00	24.00	2.06	20.00	37.00
Inside Leg Length	75.37	76.00	77.00	3.38	67.00	82.00
Crotch Length	69.31	70.00	70.00	3.39	60.00	76.50
Outside Leg Length	101.45	101. 00	100.00	4.07	98.00	114.00

n=842

Measurements in centimetres with exception of weight which is in kilograms

The mean and standard deviation were the statistical values used for calculating the initial values for the development of the size chart. The mean is the most commonly used for average value for developing size steps (Beazley, 1998; Otieno, 1999, 2008; Gupta and Gangadhar, 2004; Vronti, 2005; Kuma- Kpobee, 2009). Winks (1997) points out that the mean can be a convenient indication of obtaining central tendency.

8.3 Percentiles for Determination of Body Measurement Tables

Percentile values for body measurements are of great interest as they are valuable in depicting the spread or range of dimension and also used to estimate the degree of coverage. According to Le Pechoux and Ghosh (2002), percentiles of

body dimensions are considered as best predictors in determining body measurements. The five major percentiles 5th, 25th, 50th, and 75th and 95th referred to as quartiles may have advantages and disadvantages as well. The 5th percentile may cater for the person with the smallest measurement but it may not accommodate the person with the largest measurement. A size chart which therefore covers only 5th and 25th percentiles may not cater for larger figures. The 50th percentile covers the average person and may fail to cater for variability that exists in the human population despite the limitation it is the most widely used percentile when designing clothes. The 75th percentile may however ignore the thin figures while the 95th percentile may ignore the smaller person. According to Le Pechoux and Ghosh, (2002), percentiles method has three major limitations;

a. they are only relevant for one dimension,

b. they are specific to the population for which they are calculated,

c. single values for multiple body measurements are not additive.

This implies that percentages of the body measurements cannot be added up to attain an overall percentage. Each body measurement is treated independently.

Percentiles do not work mainly because the average person does not exist as all measurements cannot cover the same range. This is because body dimensions vary across members of a population (Le Pechoux and Ghosh, 2002). This happens because there is no fixed standards deviation and proportion. In this study percentiles were calculated to assist in determining the range of coverage of the each body dimension. The 5th, 25th, 50th, 75th, and 95th were calculated and are presented in Table 8.2.

Table 8.2: Percentiles of Body Dimensions

n=842

Body Dimensions	Percentiles				
	5th	**25th**	**50th**	**75th**	**95th**
Height	150.00	155.17	160.00	163.07	170.00
Weight (Kg)	43.80	49.20	53.85	59.90	68.65
Neck Girth	29.50	32.00	35.00	36.00	39.38
Cervical to Waist	34.00	36.00	38.00	39.50	42.00
Cervical to Ground	131.00	135.00	138.50	142.00	147.00
Neck to Shoulder point	11.00	12.00	12.00	13.00	13.50
Back Shoulder Width	35.00	37.50	39.00	40.77	43.00
Front Neck Point to Bust	22.51	24.00	25.50	26.62	27.00
Front Neck Point - Waist	35.00	38.00	40.00	43.00	47.00
Arm length	54.00	57.00	59.00	61.00	63.63
Shoulder Point to Elbow	30.00	31.50	33.00	34.00	36.00
Upper Arm Girth	23.50	26.00	27.50	29.50	33.00
Armscye Girth	32.00	34.00	36.00	38.00	41.92
Elbow Girth	26.00	28.00	29.50	31.00	34.00
Wrist Girth	14.00	15.00	15.50	16.00	17.00
Bust Girth	76.00	81.00	84.20	90.00	99.00
Under Bust Girth	62.50	66.00	69.50	72.12	78.00
Across Front	28.50	31.00	32.00	33.00	36.00
Across Back	29.50	32.00	33.50	35.00	37.45
Side waist to Ankle	92.00	96.00	99.00	102.00	107.00
Side Waist to Knee	54.00	56.50	58.50	60.62	64.00
Side Waist to Hip	16.00	18.50	20.50	21.00	22.50
Waist Girth	60.00	64.00	67.00	71.00	77.00
Upper Hip Girth	73.00	78.00	82.00	86.00	92.00
Lower Hip Girth	84.00	90.00	95.50	101.50	112.00
Thigh Girth	47.00	51.50	55.00	58.50	63.00
Knee Girth	32.00	34.00	36.00	38.00	40.50
Calf Girth	29.51	32.00	34.00	35.50	38.00
Ankle girth	21.00	23.00	24.00	25.00	27.00
Inside Leg Length	69.00	75.00	77.00	76.00	79.00
Crotch Length	63.00	67.00	70.00	71.92	74.50
Outside Leg Length	94.00	98.00	101.00	104.00	108.00

All measurements are in centimetres except weight, which is in kilograms

The study employed the mean values. The explanation of the use of the mean instead of the median has been given in Section 8.2. The percentiles relating to the body measurements will be discussed fully when the percentage coverage of each dimension is determined later in the chapter.

8.4 Analysis of Body Measurements

The analysis of data is based on the correlation of body measurements. The body dimensions were made up of vertical or linear measurements and horizontal or girth measurements which can be classified into upper torso and lower torso. Height and weight were taken as additional measurements vital to the analysis of vertical and horizontal measurements. There were 11 vertical measurements and

19 girth measurements. Body dimensions can be analysed when correlations of the body dimensions are determined. Co-efficient Correlation was used in determining the relationships between the body dimensions. Multiple co-efficient analyses helped in measuring the linear associations between two measurements.

Values used in the determination of correlations between the dimensions and identifying key parameters were based on BS 7231 (BSI, 1990). The standard specifies that; if correlation co-efficient is less than 0.5 then there is no relationship; if correlation co-efficient is between 0.6-0.75 then there is a mild relationship; and if correlation co-efficient is more than 0.76 it shows a strong or high relationship. Other researchers in developing size charts (Beazley, 1998; Gupta and Gandaghar, 2004; Vronti, 2005; Otieno, 2008; Kuma-Kpobee, 2009) adopted this parameter. Using this parameter ensures that the measurements that highly correlate with other body measurements are selected. Results of the correlations of all the body dimensions are presented in Tables 8.3.

Table 8.3 Co-efficient Correlations of Body Dimensions

Body Dimensions	Height	Weight	Neck Girth	Cervical to waist	Cervical to Ground	Neck to Shoulder Point	Back Shoulder Width	Front Neck Point to Bust	Front Neck Point to Waist	Arm Length	Shoulder Point to Elbow	Upper Arm Girth	Armscye Girth	Elbow Girth	Wrist Girth	Bust Girth
Height	-	.32	.24	.39	.84	.37	.36	.12	.27	.68	.58	.04	.17	.16	.29	.16
Weigh t (Kg)	.32	-	.40	.40	.43	.34	.41	.56	.48	.37	.30	.76	.74	.47	.66	.81
Neck Girth	.24	.40	-	.23	.23	.31	.20	.30	.20	.20	.17	.29	.32	.04	.46	.28
Cervical to Waist	.39	.28	.23	-	.49	.32	.20	.22	.32	.32	.33	.17	.19	.08	.24	.22
Cervical to Ground	.84	.43	.23	.49	-	.41	.39	.18	.33	.71	.62	.15	.25	.25	.34	.26
Neck to Shoulder point	.37	.34	.31	.32	.41	-	.49	.28	.26	.29	.24	.16	.24	.16	.30	.26
Back Shoulder Width	.36	.41	.20	.20	.39	.49	-	.19	.27	.32	.25	.26	.27	.27	.32	.29
Front Neck Point- Bust	.12	.56	.30	.22	.18	.28	.19	-	.47	.19	.16	.47	.51	.28	.41	.58
Front Neck Point -Waist	.27	.48	.12	.32	.33	.26	.27	.47	-	.23	.22	.38	.42	.26	.38	.49
Arm length	.68	.37	.20	.32	.71	.29	.32	.19	.23	-	.80	.16	.28	.25	.32	.20
Shoulder Point – Elbow	.58	.30	.17	.33	.62	.24	.25	.16	.22	.80	-	.14	.25	.22	.25	.20
Upper Arm Girth	.04	.76	.29	.17	.15	.16	.26	.47	.38	.16	.14	-	.70	.34	.58	.74
Armscye Girth	.17	.74	.32	.19	.25	.24	.27	.51	.42	.28	.25	.70	-	.39	.59	.70
Elbow Girth	.16	.47	.04	.08	.25	.16	.27	.28	.26	.25	.22	.40	.39	-	.34	.41
Wrist Girth	.29	.66	.46	.24	.34	.30	.32	.41	.38	.32	.25	.58	.59	.34	-	.58
Bust Girth	.16	.81	.28	.22	.26	.26	.29	.58	.49	.20	.20	.74	.70	.41	.58	-
Under Bust Girth	.18	.80	.30	.18	.28	.22	.33	.50	.43	.26	.23	.70	.68	.45	.56	.80
Across Front	.21	.60	.18	.16	.28	.21	.28	.45	.42	.31	.28	.53	.54	.34	.44	.59
Across Back	.24	.58	.26	.21	.30	.28	.41	.37	.28	.27	.22	.49	.49	.31	.44	.57
Side waist to Ankle	.77	.34	.20	.29	.80	.30	.30	.10	.19	.69	.60	.11	.21	.20	.27	.19
Side Waist to Knee	.67	.39	.16	.25	.72	.27	.30	.14	.18	.60	.52	.19	.24	.22	.33	.22
Side Waist to Hip	.13	.18	-.32	.03	.17	-.13	.10	.05	.07	.13	.14	.21	.15	.24	.08	.17
Waist Girth	.11	.85	.32	.19	.23	.24	.32	.56	.43	.22	.18	.78	.73	.44	.59	.83
Upper Hip Girth	.13	.79	.16	.18	.26	.16	.29	.49	.42	.21	.19	.70	.68	.42	.49	.75
Lower Hip Girth	.15	.85	.26	.19	.26	.23	.30	.50	.40	.21	.19	.74	.65	.39	.55	.78
Thigh Girth	.09	.86	.27	.16	.21	.17	.28	.52	.38	.18	.15	.77	.69	.41	.56	.78
Knee Girth	.22	.80	.30	.19	.33	.23	.30	.44	.37	.26	.23	.64	.63	.39	.61	.66
Calf Girth	.12	.75	.25	.16	.21	.16	.26	.43	.33	.19	.17	.67	.57	.40	.58	.61
Ankle Girth	.19	.40	-.04	.08	.29	.06	.27	.19	.25	.25	.21	.31	.35	.35	.34	.35
Inside Leg Length	.70	.31	.20	.26	.74	.31	.30	.12	.20	.63	.55	.04	.14	.15	.23	.14
Crotch Length	.29	.64	.24	.16	.36	.19	.29	.30	.20	.30	.26	.55	.50	.35	.49	.51
Outside Leg Length	.74	.28	.13	.26	.77	.25	.28	.09	.19	.65	.56	.06	.17	.18	.25	.14

n=842** Correlation is significant at 0.01 level (2-tailed)

Body measurements are in centimetres except weight, which is in kilograms Strong Correlations Mild Correlation

Table 8.3 Co-efficient Correlations of Body Dimensions (Continuation)

Body Dimensions	Under Bust Girth	Across Front	Across Back	Side waist to Ankle	Side Waist to Knee	Side Waist to Hip	Waist Girth	Upper Hip Girth	Lower hip Girth	Thigh Girth	Knee Girth	Calf Girth	Ankle Girth	Inside Leg Length	Crotch Length	Outside Leg length
Height	.18	.21	.24	.76	.67	.13	.11	.13	.15	.09	.22	.12	.19	.70	.29	.74
Weight (Kg)	.80	.60	.58	.34	.39	.18	.85	.79	.85	.86	.80	.75	.40	.31	.64	.28
Neck Girth	.27	.18	.26	.13	.16	-.32	.32	.16	.26	.27	.30	.25	-.04	.20	.24	.12
Cervical to Waist	.18	.16	.21	.29	.25	.03	.19	.18	.19	.16	.19	.16	.08	.26	.16	.26
Cervical to Ground	.28	.28	.30	.80	.72	.17	.23	.26	.26	.21	.33	.21	.29	.74	.36	.77
Neck to Shoulder point	.22	.21	.28	.30	.27	-.13	.24	.16	.28	.17	.23	.16	.05	.31	.19	.25
Back Shoulder Width	.33	.28	.41	.30	.30	.10	.32	.29	.30	.28	.30	.26	.27	.29	.29	.28
Front Neck Point - Bust	.50	.45	.38	.10	.14	.05	.56	.49	.50	.52	.44	.43	.19	.12	.30	.09
Front Neck Point-Waist	.43	.42	.28	.19	.18	.07	.43	.43	.40	.38	.37	.33	.25	.19	.20	.19
Arm length	.26	.31	.27	.69	.60	.13	.22	.21	.21	.18	.26	.19	.25	.63	.29	.65
Shoulder Point- Elbow	.23	.28	.22	.60	.52	.14	.18	.19	.19	.15	.23	.17	.21	.55	.26	.56
Upper Arm Girth	.70	.53	.49	.11	.19	.21	.76	.70	.72	.77	.64	.64	.31	.05	.54	.06
Armscye Girth	.68	.54	.49	.21	.24	.15	.73	.68	.65	.69	.63	.57	.35	.14	.50	.17
Elbow Girth	.45	.34	.31	.20	.22	.24	.44	.42	.39	.41	.39	.40	.35	.15	.35	.18
Wrist Girth	.56	.44	.44	.27	.33	.08	.59	.50	.55	.56	.61	.58	.33	.23	.49	.25
Bust Girth	.80	.59	.57	.19	.22	.17	.83	.75	78	.78	.66	.61	.35	.14	.51	.14
Under Bust Girth	-	.58	.56	.24	.28	.21	.87	.74	.72	.75	.64	.63	.41	.17	.54	.19
Across Front	.58	-	.32	.25	.30	.23	.58	.54	.52	.55	.46	.48	.32	.19	.45	.22
Across Back	.56	.32	-	.22	.28	.14	.60	.54	.52	.51	.43	.41	.26	.20	.39	.18
Side waist to Ankle	.24	.25	.22	-	.77	.26	.18	.21	.21	.18	.28	.18	.28	.69	.35	.79
Side Waist to Knee	.28	.30	.28	.77	-	.34	.23	.26	.30	.26	.31	.22	.28	.60	.50	.72
Side Waist to Hip	.21	.23	.14	.26	.34	-	.16	.33	.24	.26	.20	.22	.34	.02	.29	.24
Waist Girth	.87	.58	.60	.18	.23	.16	-	.81	.79	.82	.70	.66	.35	.16	.56	.12
Upper Hip Girth	.74	.54	.54	.21	.26	.33	.81	-	.78	.80	.68	.62	.42	.15	.53	.16
Lower Hip Girth	.72	.52	.52	.21	.30	.24	.79	.78	-	.89	.76	.71	.37	.16	.62	.15
Thigh Girth	.75	.55	.51	.18	.26	.26	.82	.80	.89	-	.79	.75	.39	.11	.61	.14
Knee Girth	.64	.46	.43	.28	.31	.20	.70	.68	.76	.79	-	.75	.42	.22	.57	.23
Calf Girth	.63	.48	.41	.18	.22	.21	.66	.62	.71	.75	.75	-	.34	.12	.53	.12
Ankle Girth	.41	.32	.26	.28	.28	.34	.35	.42	.37	.39	.42	.34	-	.16	.31	.24
Inside Leg Length	.17	.19	.20	.69	.59	.02	.16	.15	.16	.01	.22	.12	.16	-	.18	.67
Crotch Length	.54	.45	.39	.35	.47	.29	.56	.53	.62	.61	.57	.53	.31	.18	-	.30
Outside Leg Length	.19	.22	.18	.79	.72	.24	.12	.16	.15	.11	.23	.12	.24	.67	.30	-

n=842** Correlation is significant at 0.01 level (2-tailed)

Body measurements are in centimetres except weight, which is in kilograms Strong Correlations Mild Correlations

The correlational values determined the type of strength of relationships of the body dimensions. Twenty-three body dimensions, height and weight had some degree of relationships with each other. The results showed that the vertical dimensions had little correlations with the horizontal (girth) dimensions. From the results height correlated well with most of the vertical dimensions. The girth body dimensions correlated from mildly to strongly with each other. Seven vertical body dimensions correlated from mildly to strongly towards each other. Weight correlated with all the girth body dimensions. The vertical and girth dimensions that have correlations with each other which range from mild to strong correlations as presented in Table 8.4.

Table 8.4: Vertical and Girth Correlations of Body Dimensions

Body Dimensions	Height	Weight	Cervical to Ground	Front neck point to Bust	Arm Length	Shoulder Point to Elbow	Upper arm Girth	Armscye Girth	Wrist Girth	Bust Girth	Under Bust Girth	Across Front	Across back	Side waist to ankle	Side waist to knee	Waist girth	Upper hip girth	Lower hip girth	Thigh girth	Knee girth	Calf girth	Inside leg length	Crotch length	Outside leg length
Height	-		.84		.68	.58								.76	.67							.70		.74
Weight (Kg)		-		.56			.76	.74	.66	.81	.80	.60	.58			.85	.80	.85	.86	.80	.76		.64	
Cervical to Ground	.84		-		.71	.62								.80	.72							.74		.77
Front Neck Point- Bust		.56		-				.51		.58	.50					.56		.50	.52					
Arm length	.68		.71		-	.80								.69	.60							.63		.65
Shoulder Point to Elbow	.58		.62		.80	-								.60	.52							.55		.56
Upper Arm Girth		.76					-	.70	.58	.74	.70	.53				.76	.70	.72	.77	.64	.64		.54	
Armscye Girth		.74		.51			.70	-	.59	.70	.68	.54				.73	.68	.65	.69	.63	.57		.50	
Wrist Girth		.66					.58	.59	-	.58	.56					.59	.50	.55	.56	.61	.58			
Bust Girth		.81		.58			.74	.70	.58	-	.80	.59	.57			.83	.76	.78	.78	.66	.61		.51	
Under Bust Girth		.80		.50			.70	.68	.56	.80	-	.58	.56			.87	.74	.72	.75	.64	.63		.54	
Across Front		.60					.53	.54		.59	.58	-				.58	.54	.52	.55					
Across Back		.58								.57	.56		-			.60	.54	.52	.51					
Side Waist to Ankle	.77		.80		.69	.60								-	.77							.69		.79
Side Waist to Knee	.67		.72		.60	.52								.77	-							.60	.50	.72
Waist Girth		.85		.56			.78	.73	.59	.83	.87	.58	.60			-	.81	.79	.82	.70	.66		.56	
Upper Hip Girth		.80					.70	.68		.76	.74	.54	.54			.81	-	.78	.80	.68	.62		.53	
Lower Hip Girth		.85		.50			.74	.65	.55	.78	.72	.52	.52			.79	.78	-	.89	.76	.71		.62	
Thigh Girth		.86		.52			.77	.69	.56	.78	.75	.55	.51			.82	.80	.89	-	.79	.75		.61	
Knee Girth		.80					.64	.63	.61	.66	.64					.70	.68	.76	.79	-	.75		.57	
Calf Girth		.76					.67	.57	.58	.61	.63					.66	.62	.71	.75	.75	-		.53	
Inside Leg Length	.70		.74		.63	.55					.54			.69	.59							-		.67
Crotch Length																								
Outside Leg Length	.74		.77		.65	.56								.79	.72							.67		-

n=842** Correlation is significant at 0.01 level (2-tailed)

Body measurements are in centimetres except weight, which is in kilograms Strong Correlations

8.5 Determination and Selection of Key Dimensions from Data

Key dimensions are very critical when developing a size chart. Determination of key dimensions, size widths and designation are very important aspect of sizing as it is been used by manufacturers and consumers in recognising and selecting a size (Otieno, 2008). Suitable key dimensions can be selected only when all body measurements are correlated to establish the relationship between them. The key dimensions should have strong multiple correlations with other dimensions, must be predictor of size for other body parts and easy to measure as well (Robinette, 1986; Chun-Yoon and Jasper, 1996). McConville et al. (1979) state that key dimensions must be convenient to measure, should form an integral part of the clothing and have a high degree of correlation with other dimensions important in design and sizing.

The key dimensions most often used for developing sizing systems are height and bust. The ISO and BSI systems use bust circumference for most upper-body garments and whole-body garments. The International Organisation of Standards (ISO, 8559:1989) recommend bust, waist and hip as key dimensions for women outer garment. Bust and waist can be used for upper torso garments while waist and hip can be selected for lower torso garments. Many researchers used these key dimensions in developing various size charts (Beazley, 1998; Otieno and Fairhurst, 2000; Gupta and Gangadhar, 2004; Otieno, 2008). O'Brien and Shelton (1941) established that the best predictors of female body were height for the length dimensions and weight for girth dimensions. Height closely related to the vertical body dimensions and weight correlated with most of the trunk circumference measurements but weight was not selected as a key dimension. Green (1981) selected bust and hip dimensions as key dimensions in place of weight because the two dimensions offered flexibility for varying size relationships between upper and lower parts of the body. Weight cannot be used to determine how small or big a body may be as such it is not a good predictor of body size.

In this study, the key dimensions were determined using correlation analysis based on the 32 body dimensions taken from 842 Ghanaian women aged 16-35 years. Although four body dimensions; bust, waist, hip and thigh and height and weight were identified as having good correlations with the majority of body dimensions after the correlation analysis, three were selected in addition to height as key dimensions for the study. According to Winks (1994), a combination of

vertical and girth measurements must be used if all the measurements are to be accurately predicted. Three girth measurements; bust, waist and hip, which had good correlations with weight, were chosen as key dimensions for this study as they have been used for creating women size charts by many surveys (O'Brien and Shelton, 1941; BS EN 13402-3, 2004; Beazley, 1999; Vronti, 2004; Gupta and Gangadhar, 2004; Otieno, 2008).

8.5.1 Frequency Distribution for Selected Key Dimensions

The frequency distribution of the body dimensions using histogram with a normal curve, showing the 4 key dimensions selected for the development of the size chart are presented in Figures 8.1 to 8.4. All the four histograms with a normal curve show the frequency, mean, standard deviation and number of participants.

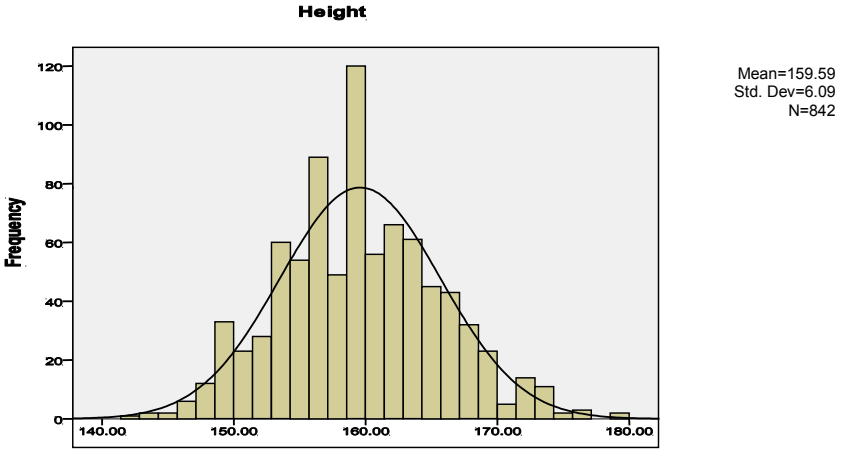

Figure 8.1: Frequency Distribution of Height

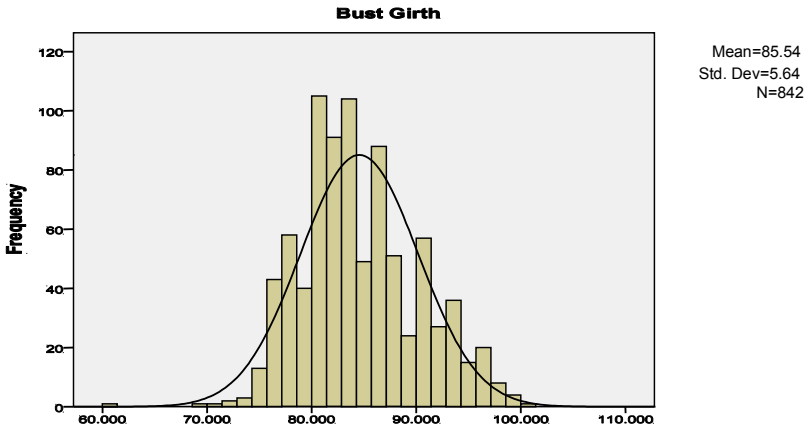

Figure 8.2: Frequency Distribution of Bust Girth

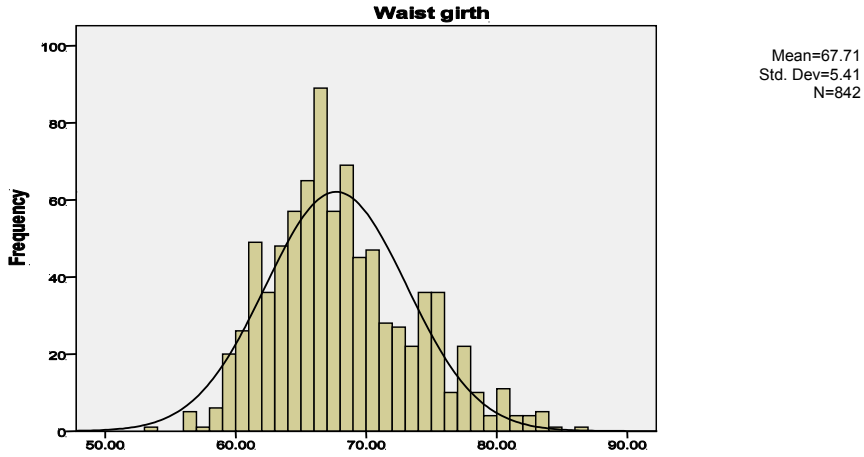

Figure 8.3: Frequency Distribution of Waist Girth

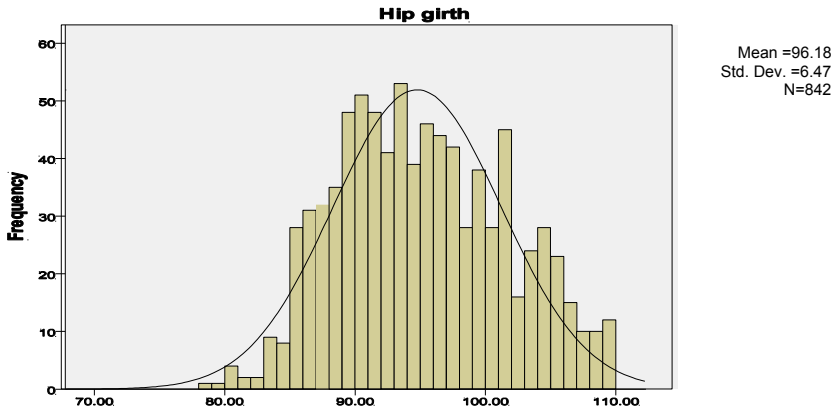

Figure 8.4: Frequency Histogram Distribution of Lower Hip Girth

8.6 Development of Size Chart from Raw Data

The development of size chart was carried out by using values obtained from the statistical information of body dimensions. The mean values were used as they are the base size for the development of every size chart. The mean value is the most widely used value for size steps and it is equivalent to the average size and the size 12 of every size chart. The mean values together with the standard deviation values of each body dimensions were utilised by creating size steps. The size steps were developed by adding and subtracting the standard deviation value from the mean to obtain different values. Three main aspects that need consideration when developing a size chart is the relationship between one dimension and another; the size intervals by which one garment is larger than the next smaller garment and finally identification the size (Beazley, 1998; Winks, 1997). The development of size chart involved the use of descriptive statistics of the body dimensions of 842 women measured for the study as presented in Table 8.2.

To obtain five steps for five categories of body sizes, one standard deviation (1SD) and two standard deviations (2SD) values are added to the mean to obtain two values that are higher than the mean. One standard deviation (-1SD) and two standard deviation (-2SD) values are subtracted from the mean sequentially to obtain two values that were less than the mean. Cramer (1998) specifies that the entire sample is statistically catered for by using five standard deviation divisions. By subtracting one standard deviation and two standard deviation values (-1SD and -2SD) from the mean, size 8 and size10 are obtained. When one standard deviation value and two standard deviation values (+1SD and +2SD) are added, the values obtained are size 14 and size 16. Another step, which is termed as extrapolation can be obtained for each side by adding and subtracting two and half standard deviation values (±2.5SD) to the mean when the outliers are many (Otieno, 2008). The size 18 and 6 could be demarcated by adding and subtracting two and half standard deviation values from the mean. The two and half standard deviation (-2.5SD and +2.5SD) values are calculated to create more sizes using the same raw data and cater for a wider range of the population. In this study the seven steps approach was initially used to find out the extent of coverage of the individual body dimensions. The mean and the standard deviation figures were all rounded up to the nearest decimal place. Percentages above 0.5 cm were rounded up to 1.0 cm and values below 0.5 have been eliminated. This was to ensure easy calculation of figures for the size chart and to undo any uneven

number of millimetres. Table 8.5 shows the derived values of seven steps for creating of sizes from the body dimensions.

Table 8.5 Size Steps and Number of Outliers

	-0	Mean -2.5SD	Mean -2SD	Mean -1SD	Mean	Mean +1SD	Mean +2SD	Mean +2.5SD	S D	+0
Height	3	145	148	154	160	166	172	175	6	5
Weight (Kg)	0	35	39	47	55	63	71	75	8	6
Neck Girth	2	32.5	33	34	35	36	37	37.5	1	3
Cervical to Waist	62	33	34	36	38	40	42	43	2	5
Cervical to Ground	4	124	129	134	139	144	149	152	5	6
Neck to Shoulder point	0	9.5	10	11	12	13	14	14.5	1	3
Back Shoulder Width	53	36.5	37	38	39	40	41	41.5	1	19
Front Neck Point- Bust	0	21	22	24	26	28	30	31	2	12
Front Neck point -Waist	69	36	37	39	41	43	45	46	2	0
Arm length	3	51.5	53	56	59	62	65	66.5	3	13
Shoulder Point- Elbow	7	28	29	31	33	35	37	38	2	0
Upper Arm Girth	0	20.5	22	25	28	31	34	35.5	3	10
Armscye Girth	4	28.5	30	33	36	39	42	43.5	3	12
Elbow Girth	2	22.5	24	27	30	33	36	37.5	3	6
Wrist Girth	0	12.5	13	14	15	16	17	17.5	1	7
Bust Girth	3	71	74	80	86	92	98	101	6	0
Under Bust Girth	0	57.5	60	65	70	75	80	82	5	6
Across Front	2	27	28	30	32	34	36	37	2	10
Across Back	20	29	30	32	34	36	38	39	2	12
Side waist to Ankle	3	89	91	95	99	103	107	109	4	5
Side Waist to Knee	5	51.5	53	56	59	62	65	66.5	3	9
Side Waist to Hip	6	18.5	19	20	21	22	23	23.5	1	3
Waist Girth	1	55.5	58	63	68	73	78	80.5	5	26
Upper Hip Girth	3	67	70	76	82	88	94	97	6	6
Lower Hip Girth	3	81	84	90	96	102	108	111	6	0
Knee Girth		42.5	45	50	55	60	65	67.5	5	1
Thigh Girth	5	28.5	30	33	36	39	42	43.5	3	17
Calf girth	10	26.5	28	31	34	37	40	41.5	3	5
Ankle Girth	0	19	20	22	24	26	28	29	2	14
Inside Leg Length	6	67.5	69	72	75	78	81	82.5	3	9
Crotch Length	3	58.5	61	66	69	72	75	76.5	3	7
Outside Leg Length	1	91	93	97	101	105	109	111	4	4

n=842

(All values are in centimetres with exception of weight which is kilograms)

From the Table 8.6 above seven steps were calculated and the extreme values or the outliers determined. The first column contains the body dimensions, the second column shows represent the extreme values (outliers) after the two and half standard deviation (-2.5SD) were calculated. Between the third and ninth Columns show the dimensions obtained after the seven steps were calculated using the standard deviation and the mean of each body dimension. The tenth column contains the values of the standard deviation for each body dimension. The eleventh column also shows the extreme values obtained after the +2.5SD was calculated. To illustrate how these size steps were calculated using the formula, the height would be used as an example. The mean of the height was

160cm and the standard deviation was 6cm in order to obtain the next step upward 1 standard deviation was added to the mean, which resulted in increasing the figure by 6cm and thereby obtaining 166cm. The next step was obtained by adding two standard deviations and the result was 172cm, the two lower values were obtained by subtracting one standard deviation and two standard deviations sequentially from 160cm and the results were 154cm and 148cm. The two and half standard deviation values were also obtained by adding and subtracting half of the standard deviation to/from the height mean value, which was 3cm to the mean to obtain 175cm and from the mean to obtain 145cm.

8.7 Determination of Size Ranges from Raw Data

The determination of a size range involves demarcating the extreme values from the frequency table. These extreme values are termed as outliers because it is always impossible to accommodate all the population of the study in the size chart. The researcher discovered that the outliers after the calculation of seven step approach were very few and therefore there was no need for extrapolation. Five size steps approach was therefore used as it was suitable to this study. The size size interval obtained for height was wide. The inter-size interval for height was normalised as the use of the standard deviation would result in wider intervals for the sizes. The percentile for height was considered but it was not used, as the 50^{th} percentile, which could be used, was almost the same as the mean. It is recommended that the 50^{th} percentile should be used for clothing purposes in order to accommodate a number of the population (reference). The normalisation was finally done in accordance to the BS EN: 13403-4 (2004), which indicates that maximum flexibility can be maintained as it is left up to a country and/or company to choose 4 cm or 8 cm intervals, of which 8 cm is recommended for general use and intervals of 4 cm for trousers. The 4cm interval was used for the size steps for the height dimension in this study as it was intended for ready-to-wear clothing, which includes trousers. The outliers were therefore determined based on the values of the five size steps. For instance, the lowest value of the five size steps for height is 152cm and highest is 168cm with an interval of 6cm. All values, which was below 152cm and above 168cm were eliminated and classified as outliers or extreme values. The size range was therefore between the two values. Table 8.6 presents the size range of each body dimension, with the number of outliers.

The total outliers and their percentages were calculated based on the size steps. This was carried out to determine the range and the coverage of the size chart. For instance, the size range for height was between 152cm and 168cm showing five size steps between these two values. The total outliers were values, which was below 152cm, which was the smallest size, and above 158cm, which was the largest size. With height the total outlier were 19 representing 2.3%.

Table 8.6: Size Ranges from Raw Data

Body Dimensions	-0	Mean -2SD	Mean -1SD	Mean	Mean +1SD	Mean +2SD	SD	+0
Height	32	152	156	160	164	168	4	28
Weight (Kg)	16	39	47	55	63	71	8	8
Neck Girth	39	33	34	35	36	37	1	38
Cervical to Waist	38	34	36	38	40	22	2	31
Cervical to Ground	4	129	134	139	144	149	5	18
Neck to Shoulder point	6	10	11	12	13	14	1	25
Back Shoulder Width	40	37	38	39	40	41	1	31
Front Neck Point- Bust	11	22	24	26	28	30	2	10
Front Neck point -Waist	23	37	39	41	43	45	2	10
Arm length	13	53	56	59	62	65	3	21
Shoulder Point- Elbow	11	29	31	33	35	37	2	12
Upper Arm Girth	7	22	25	28	31	34	3	18
Armscye Girth	10	30	33	36	39	42	3	20
Elbow Girth	4	24	27	30	33	36	3	10
Wrist Girth	0	13	14	15	16	17	1	18
Bust Girth	16	74	80	86	92	98	6	29
Under Bust Girth	5	60	65	70	75	80	5	19
Across Front	11	28	30	32	34	36	2	34
Across Back	21	30	32	34	36	38	2	31
Side waist to Ankle	8	91	95	99	103	107	4	18
Side Waist to Knee	10	53	56	59	62	65	3	12
Side Waist to Hip	14	19	20	21	22	23	1	12
Waist Girth	13	58	63	68	73	78	5	23
Upper Hip Girth	9	70	76	82	88	94	6	16
Lower Hip Girth	7	84	90	96	102	108	6	24
Thigh Girth	9	45	50	55	60	65	5	23
Knee Girth	3	30	33	36	39	42	3	13
Calf Girth	13	28	31	34	37	40	3	10
Ankle Girth	0	20	22	24	26	28	2	18
Inside Leg Length	17	69	72	75	78	81	3	31
Crotch Length	14	63	66	69	72	75	3	12
Outside Leg Length	11	94	97	101	105	109	4	18

n=842

(All values are in centimetres with exception of weight, which is in kilograms)

The total outliers obtained for the body dimensions showed in Table 8.7 were less than 10% of the population the three body dimension; back shoulder width, neck girth and cervical to waist having more outliers The five steps covered above 91% of all the body dimensions of the population used for this study. The percentage of the outliers for the body dimensions have also been calculated and tabulated in Table 8.7.

Table 8.7: Total Number and Percentages of Outliers

Body Dimensions	Mean -2SD	Mean -1SD	Mean (cm)	Mean +1SD	Mean +2SD	Total Number of Outliers	Total Percentage of Outliers
Height	152	156	160	164	168	50	5.9
Weight (Kg)	39	47	55	63	71	24	2.9
Neck Girth	33	34	35	36	37	87	10.3
Cervical to Waist	34	36	38	40	42	92	10.9
Cervical to Ground	129	134	139	144	149	22	2.6
Neck to Shoulder point	10	11	12	13	14	25	3.0
Back Shoulder Width	37	38	39	40	41	97	11.5
Front Neck Point to Bust	22	24	26	28	30	21	2.5
Front Neck point- Waist	37	39	41	43	45	73	8.7
Arm length	53	56	59	62	65	34	4.0
Shoulder Point to Elbow	29	31	33	35	37	23	2.7
Upper Arm Girth	22	25	28	31	34	25	3.0
Armscye Girth	30	33	36	39	42	30	3.6
Elbow Girth	24	27	30	33	36	15	1.8
Wrist Girth	13	14	15	16	17	18	2.1
Bust Girth	74	80	86	92	98	45	5.3
Under Bust Girth	60	65	70	75	80	24	2.9
Across Front	28	30	32	34	36	45	5.3
Across Back	30	32	34	36	38	36	4.3
Side waist to Ankle	91	95	99	103	107	26	3.1
Side Waist to Knee	53	56	59	62	65	52	6.2
Side Waist to Hip	19	20	21	22	23	26	3.1
Waist Girth	58	63	68	73	78	36	4.3
Upper Hip Girth	70	76	82	88	94	25	3.0
Lower Hip Girth	84	90	96	102	108	31	3.7
Thigh Girth	45	50	55	60	65	32	3.8
Knee Girth	30	33	36	39	42	16	1.9
Calf girth	28	31	34	37	40	23	2.7
Ankle Girth	20	22	24	26	28	18	2.1
Inside Leg Length	69	72	75	78	81	48	5.7
Crotch Length	63	66	69	72	75	26	3.1
Outside Leg Length	93	97	101	105	109	29	3.4

n=842
(All values are in centimetres with exception of weight, which is in kilograms)

8.8 Determination of Inter-Size Interval

Size interval is the division of sizes in a size chart (Kunick, 1984). According to Cooklin (1994), the size interval is influenced by the magnitude of the garment measurement tolerances. He further points out that an interval smaller than the limit of measuring error for a major girth measurement will not be suitable and therefore suggested that an interval of 4cm is convenient. The BS EN 13402-3 (2004) states that in order to accommodate variations in height by a country and company system, 4cm or 8cm interval for women is standardised. The same standard also recommended an interval of 4cm or 6cm for both bust and waist and 4cm or 5cm for hip in order to have flexible link between the bust, waist and hip. Beazley (1998) used 4cm interval for the key dimensions (bust, waist and hip) for size 8-14 and 6cm interval for size 16 to normalise the intervals. According to

Aldrich (2003), many British companies use 5cm interval between all sizes. Kunick (1984) states that there are variability of size interval some as low as 3cm and some as high as 8cm but he proposes that the most logical one is an interval of 6cm and it is one which is used by most countries.

With this study, the intervals for the key dimensions were within the recommended figures. The inter-size interval for height was 4cm, bust girth 6cm, waist 5cm and hip girth 6cm. The Table 8.8 shows the intervals between the sizes of the key dimensions.

Table 8.8: Size Intervals of Key Dimensions

Body Dimensions	Size 8	Size 10	Size 12	Size 14	Size 16	Size Interval
Height	152	156	160	164	168	4
Bust girth	74	80	86	92	98	6
Waist girth	58	63	68	73	78	5
Lower hip girth	84	90	96	102	108	6

n=842

(All values are in centimetres)

Table 8.8 shows the inter-size intervals of all body dimensions. Size interval was determined when one size was subtracted from the other. For instance, interval between sizes 8 and 10 can be determined by subtracting 148cm from 154cm, which showed a size interval of 6cm.

8.9 Determination of Size Codes

According to Cooklin (1990), size code is a symbol used between the manufacturer and the consumer. It can be represented in an alpha numerical or numerical or a symbol that provides instant recognition whether the clothing size is suitable or not. Chun-Yoon and Jasper (1996) state that most countries label their women's garments using numerical value but they add that coding may vary from country to country. Each size is given a code that is generally recognised by the public (Beazley, 1998). For this study, the size codes were determined after generating the five size steps values from the body dimensions. The size codes were based on the numerical coding method. The size steps were obtained as demonstrated in Section 8.6. The size codes therefore developed for the study were coded size 8, size 10, size 12, size 14 and size 16. The developed sizes were termed as Ghanaian size charts. The sizes therefore become GHA size 8,

GHA size 10, GHA size 12, GHA size 14, and GHA size 16. Table 8.9 shows the size codes along with the body dimensions.

Table 8.9: Size Codes for the Ghanaian Women

Body dimension	Size Codes				
	Size GHA 8	Size GHA 10	Size GHA 12	Size GHA 14	Size GHA 16
Height	152	156	160	164	168
Weight (Kg)	39	47	55	63	71
Neck Girth	33	34	35	36	37
Cervical to Waist	34	36	38	40	42
Cervical to Ground	129	134	139	144	151
Neck to Shoulder point	10	11	12	13	14
Back Shoulder Width	37	38	39	40	41
Front Neck Point to Bust	22	24	26	28	30
Front Neck point - Waist	37	39	41	43	45
Arm Length	53	56	59	62	65
Shoulder Point to Elbow	29	31	33	35	37
Upper Arm Girth	22	25	28	31	34
Armscye Girth	30	33	36	39	42
Elbow Girth	24	27	30	33	36
Wrist Girth	13	14	15	16	17
Bust Girth	74	80	86	92	98
Under Bust Girth	60	65	70	75	80
Across Front	28	30	32	34	36
Across Back	30	32	34	36	38
Side waist to Ankle	91	95	99	103	107
Side Waist to Knee	53	56	59	62	65
Side Waist to Hip	19	20	21	22	23
Waist Girth	58	63	68	73	78
Upper Hip Girth	70	76	82	88	94
Lower Hip Girth	84	90	96	102	108
Thigh Girth	45	50	55	60	65
Knee Girth	30	33	36	39	42
Calf Girth	28	31	34	37	40
Ankle Girth	20	22	24	26	28
Inside Leg Length	69	72	75	78	81
Crotch Length	63	66	69	72	75
Outside Leg Length	93	97	101	105	109

n=842

(All values are in centimetres)

8.10 Comparison of Current Size Chart with Others

Various studies have been compared (Kuma- Kpobee, 2009). Comparison can be made when similar parameters for example age, gender, ethnicity and lifestyle of the chosen population were used to determine the mean values of the study. Zernike (2004) articulated that the main factors that contributed to the differences in body sizes for the SizeUSA were race, ethnicity and age. Gupta (2004) conducted a survey in India using three age groups (18-24, 25-35 and 36-45) and found some developments of the growth of the body shape. He revealed that the body of the women in the first age category have more curvaceous figure with a

well defined waist between the girths but it changes to a more rectangular shape with no waist definition as they approach age 36. This shows that the younger generation may have smaller girths which are well defined in comparison to the older generation. Research has shown that for every decade of age, women, naturally tend to increase in weight by 2.26-4.53 kilograms causing their body size to increase (Garner, 1997; Prevos, 2005). It can therefore be concluded that age is a very strong determining factor of the body dimensions. The current anthropometric study was compared with other studies that have taken place in recent years. Table 8:10 shows the key dimensions which were used by each study for the development of the size charts.

Table 8.10: Summary of Various Size Charts

Body Dimensions (CM)	Size UK (size 12	Beazley (Size 12)	(Size 12)Size USA Regular	Gupta and Gangadhar (Size 12)	Vronti (Size 12)	(Size 12)Kuma-Kpobee	(Size 12)Current study size
Age	16-95	18-28	18-66	18-45	20-54	20-54	16-35
Height	163	165	160	156	159	158	160
Bust Girth	89	86	96	88	91	92	86
Waist Girth	71	68	76	68	79	78	68
Lower Hip Girth	96.5	96	104	90	100	101	96

8.10.1 Demographic Factors of the Various Studies Conducted

The demographic factors of the various studies were compiled in order to make a good comparison. These factors included age, ethnicity, country, population of each study. Size UK survey which scanned 5000 women aged 16-90+years was conducted in three geographic regions in the UK. Information on the following demographics; age, ethnic origin, socio economic group and geo-demographics were obtained. Size USA survey scanned 6300 women aged 18-66+ years. The women were grouped into six age categories, and into four ethnicities (Hispano-American, Asian-American and others, African-American, and Caucasian-American). Beazley (1997) measured 100 students manually aged 18-28 years,

from the Department of Clothing Design and Technology, Manchester Metropolitan University, Manchester, UK. Gupta and Gangadhar (2004) used already existing data on 2,095 Indian women aged 18-45 years in six metro cities. Vronti (2004) measured 813 women in Cyprus, age 20-54 years using manual method. Kuma-Kpobee (2009) measured 600 women aged 20-54 years in three metropolitan cities in Ghana, using manual method. The current study measured 842 Ghanaian women aged 16-35 years manually in two metropolitan cities.

Considering the demographic factors outlined in the paragraph above, the age group and ethnicity were the factors that could be used to compare the similarities and the differences in the listed surveys as shown in Table 8.10. Out of the seven surveys, only three could be compared effectively with the current study. Beazley (1997-1999) and Gupta and Gangadhar (2004) studies focused on the younger generation aged between 18-45 years and the current study used age 16-35 years. The study of Kuma-Kpobee (2009) focused on the same population but different target group aged 20-54 years. The age differences however resulted in the variations in the key dimensions of the two studies. Kuma-kpobee's size charts covered 80% and this study covered 91% of the Ghanaian population. The results obtained from the current study indicated smaller girths, which were closer to that of Beazley and Gupta and Gangadhar's surveys. This affirms that age is a key factor in obtaining results from an anthropometric survey.

8.10.2 Comparison of Inter-Size Interval

The inter-size interval of the current study was compared with the studies listed in Table 8.11. Though other studies used different populations and had different body dimensions, the inter-size interval should not deviate from the acceptable one within the practice of developing size charts. Inter-size is an important aspect in the development of the size chart. Most studies have used 4 and 5cm inter-size intervals. Winks (1997) and BS EN 13402-3 (2004) standard agree that an inter-size interval between 4 and 6 is acceptable with regards to garment manufacture and fit. This shows that the current study used an acceptable inter-size interval to develop the size chart for the Ghanaian women. It can also be compared with other size charts (Winks, 1997; BS EN 13402-3, 2004). The current study used the inter-size interval obtained directly from the data without normalising the data

because the variations were not too wide. Table 8.11 shows the inter-size interval of the key dimensions of other studies and the current study.

Table 8.11: Comparison of Inter-Size Intervals

Variable (CM)	*Current Study and Other Studies*								
	BS EN Standards	Beazley Study (1997-98)	Gupta and Gangadhar (2004	Swaziland Size Chart (2007)	South Africa (2007)	UK Size Chart (1997)	Kuma-Kpobee (2009)	Winks (1997)	Ghana Current Study
Bust	4&6	4	5	4&5	4&5	4&5	5	4&6	6
Waist	4&6	4	5	4	4	4	5	4&6	5
Lower Hip	4&5	4	5	4&5	4&5	4&5	5	4&6	6

8.11 Determination of Lower and Upper Limits of Sizes

Determining the lower and upper limit is an important step which helps in establishing the limit of each size and demonstrate the extent of coverage for inter size ranges. The value obtained for each size code is used as the midway point and the lower and the upper limit are determined from it. The lower and the upper limits are determined by adding or subtracting half value of the standard deviation of each body dimension to the midpoint value. A value 0.01 is subtracted from the figure obtained below the midpoint to demarcate limits between the lower value of the next size and the upper value of the previous size. For example, the height measurement for size GHA 12 is 160cm and the standard deviation is 6.0cm, half of the standard deviation is 3.0cm. When this value is subtracted from 160cm the figure obtained for the lower limit is 157cm and when 3.0cm is added to 160cm, the figure obtained for the upper limit becomes 163cm. In order to avoid overlapping of figures with the next size a value of 0.01 is subtracted from the upper limit making it less than the next value. This procedure has been used by other researchers (Beazley, 1998; Mlauli, 2002; Vronti, 2004; Otieno, 2009, 1999; Kuma Kpobee, 2009). The lower and the upper limit are important in establishing what percentages of the population are covered by each size. The lower, midway

point and upper limit of all the body dimensions have been tabulated and presented in Table 8.12.

Table 8.12: Lower and Upper Limit of Size Code

Body Dimensions (cm)	GHA Size 8	GHA Size10	GHA Size 12	GHA Size14	GHA Size16
Height	150.00	154.00	158.00	162.00	166.00
	152.00	**156.00**	**160.00**	**164.00**	**168.00**
	153.99	157.99	161.99	165.99	169.99
Weight (kg)	35.00	43.00	51.00	59.00	67.00
	39.00	**47.00**	**55.00**	**63.00**	**71.00**
	42.99	50.99	58.99	66.99	74.99
Neck Girth	32.50	33.50	34.50	35.50	36.50
	33.00	**34.00**	**35.00**	**36.00**	**37.00**
	33.49	34.49	35.49	36.49	37.49
Cervical to Waist Level	33.00	35.00	37.00	39.00	41.00
	34.00	**36.00**	**38.00**	**40.00**	**42.00**
	34.99	36.99	38.99	40.99	42.99
Cervical to Ground Level	127.50	132.50	137.50	142.50	146.50
	129.00	**134.00**	**139.00**	**144.00**	**149.00**
	131.49	136.49	141.49	146.49	151.49
Neck to Shoulder Point	09.50	10.50	11.50	12.50	13.50
	10.00	**11.00**	**12.00**	**13.00**	**14.00**
	10.49	11.49	12.49	13.49	15.49
Back Shoulder Width	36.50	37.50	38.50	39.50	40.50
	37.00	**38.00**	**39.00**	40.00	**41.00**
	37.49	38.49	39.49	40.49	41.49
Front Neck Point to Bust	21.00	23.00	25.00	27.00	29.00
	22.00	**24.00**	**26.00**	**28.00**	**30.00**
	23.99	24.99	26.99	28.99	30.99
Front Neck Point to waist	36.00	38.00	40.00	42.00	44.00
	37.00	**39.00**	**41.00**	**43.00**	**45.00**
	37.99	39.99	41.99	43.99	45.99
Arm Length	51.50	54.50	57.50	60.50	63.50
	53.00	**56.00**	**59.00**	**62.00**	**65.00**
	54.49	57.49	60.59	63.49	66.49
Shoulder Point to Elbow	28.00	30.00	32.00	34.00	36.00
	29.00	**31.00**	**33.00**	**35.00**	**37.00**
	29.99	31.99	33.99	35.99	37.99
Upper Arm Girth	20.50	23.50	26.50	29.50	32.50
	22.00	**25.00**	**28.00**	**31.00**	**34.00**
	23.49	26.49	29.49	32.49	35.49
Armscye Girth	28.50	31.50	34.50	37.50	40.50
	30.00	**33.00**	**36.00**	**39.00**	**42.00**
	31.49	34.49	37.49	40.49	43.49
Elbow Girth	22.50	25.50	28.50	31.50	34.50
	24.00	**27.00**	**30.00**	**33.00**	**36.00**
	25.49	28.49	31.49	34.49	37.50
Wrist Girth	12.50	13.50	14.50	15.50	16.50
	13.00	**14.00**	**15.00**	**16.00**	**17.00**
	13.49	14.49	15.4 9	16.49	17.49
Bust Girth	71.00	77.00	83.00	89.00	95.00
	74.00	**80.00**	**86.00**	**92.00**	**98.00**
	76.99	82.99	88.99	94.99	100.99
Under Bust girth	57.50	62.50	67.50	72.50	77.50
	60.00	**65.00**	**70.00**	**75.00**	**80.00**
	62.49	67.49	72.49	77.49	82.49
Across Front	27.00	29.00	31.00	33.00	35.00
	28.00	**30.00**	**32.00**	**34.00**	**36.00**
	28.99	30.99	32.99	34.99	36.99
Across back	29.00	31.00	33.00	35.00	37.00
	30.00	**32.00**	**34.00**	**36.00**	**38.00**
	30.99	32.99	34.99	36.99	38.99
Side Waist to Ankle	89.00	93.00	97.00	101.00	105.00
	91.00	**95.00**	**99.00**	**103.00**	**107.00**
	92.99	96.99	100.99	104.99	111.49
Side Waist to Knee	50.50	53.50	56.50	59.50	62.50
	52.00	**55.00**	**58.00**	**61.00**	**64.00**
	53.49	56.49	59.49	62.49	65.49
Side Waist to Hip	18.50	19.50	20.50	21.50	22.50
	19.00	**20.00**	**21.00**	**22.00**	**23.00**
	19.49	20.49	21.49	22.49	23.49
Waist Girth	55.50	60.50	65.50	70.50	75.50
	58.00	**63.00**	**68.00**	**73.00**	**78.00**
	60.49	65.49	70.49	75.49	80.50
Upper Hip Girth	68.00	73.00	79.00	85.00	91.00

(Measurements in centimetres) The midway point values have been bolded

8.11.1 Size Chart Coverage

The size range of the size chart developed covered over 91% of the women measured. Percentage coverage differed from each body dimension. Most of the women were within sizes 10-14. The women whose key body dimensions were within sizes 10-14 were as follows; 695 for height, 708 for bust girth, 713 for the waist girth and 703 for the lower hip girth. Table 8.13 shows the total number of coverage and the percentages for all the body dimensions.

Table 8.13: Size Chart Coverage

Body Dimensions	GHA Size 8	GHA Size 10	GHA Size 12	GHA Size 14	GHA Size 16	Total Number of women	Total Percentage Coverage%
Height	45	210	310	175	52	792	94.1
Weight (Kg)	21	218	340	176	63	818	97.1
Neck Girth	24	214	292	185	40	765	91.1
Cervical to Waist	30	153	294	249	99	773	91.8
Cervical to Ground	36	204	348	199	33	820	97.4
Neck to Shoulder point	35	136	351	220	75	817	97.0
Back Shoulder Width	30	154	293	208	60	771	91.5
Front Neck Point Bust	26	117	320	279	79	821	97.5
Front Neck point Waist	13	123	353	278	42	809	96.0
Arm length	34	186	313	215	60	808	96.0
Shoulder Point Elbow	31	202	333	211	42	819	97.3
Upper Arm Girth	37	250	320	160	50	817	97.0
Armscye Girth	39	191	316	209	57	812	96.4
Elbow Girth	37	144	294	240	113	828	98.3
Wrist Girth	12	124	356	260	72	842	97.9
Bust Girth	35	236	288	184	54	797	94.7
Under Bust Girth	38	241	342	157	40	818	97.1
Across Front	37	153	320	205	82	797	94.7
Across Back	33	125	284	246	118	806	95.7
Side waist to Ankle	22	193	336	212	53	816	96.9
Side Waist to Knee	37	169	318	236	60	820	97.3
Side Waist to Hip	63	137	280	206	108	794	94.3
Waist Girth	47	240	311	162	56	816	96.9
Upper Hip Girth	24	220	320	205	48	817	97.0
Lower Hip Girth	45	225	275	203	63	811	97.3
Thigh Girth	48	168	323	211	60	810	96.2
Knee Girth	40	222	286	186	92	826	98.1
Calf girth	25	231	345	191	27	819	97.3
Ankle Girth	20	182	360	230	32	842	97.9
Inside Leg Length	38	205	309	192	50	794	94.3
Crotch Length	36	216	351	183	30	816	96.9
Outside Leg Length	35	210	334	190	44	813	96.6

n=842

(Measurements in centimetres)

Using the lower and the upper limit, height coverage was beyond the 5th percentile and over the 95%, which shows coverage of 97.7%. The bust girth also covered beyond the 5th percentile to the 95th percentile showing coverage of 94.7%. With the waist girth, the population coverage was beyond the 5th percentiles and beyond the 95th percentile showing coverage of 96.5% and finally the lower hip girth also covered beyond the 5th percentile and within the 95th percentile with population coverage of 97.3%. From the individual percentiles, it can be deduced that there is a good coverage of the population. Petrova (2007) indicated that the accommodation rate is typically between 65%-85% depending on the type of clothing. According the Winks (1994), for ready-to-wear clothing having an acceptable good fit, a manufacturer could reasonably aim production at the 80th percentile of the surveyed data, and not catering for 10% of each of the extremes.

The extent of the actual coverage of a size chart depends on the type of clothing, the degree of fit and variation of body shape among the population (Winks, 1997; Petrova, 2007).

8.12 Development of Garment Measurements

The verification of the developed size chart becomes crucial for its acceptance. To be able to verify the size chart, garments measurements should be developed for the preparation of the patterns and subsequently the garment for trials. Garment measurements are therefore developed based on addition of ease allowances to allow the movements, expansion and comfort needed by the body (Beazley, 1999; Gupta and Gangadhar, 2004). According to Beazley (1999) the fit and size of a garment is influenced by the dimensional clearance allowed between the body and the garment. A garment should be larger than the wearer to allow for movement and expansion. Otieno (2009) states that there are variations in the amount of ease allowance utilised for specific measurements as a result these variations are not usually comparable between manufacturers with the decision to use them subjectively. Beazley (1999) indicates that when formulating finished garments size chart the increments between the sizes should not be less or the same as the manufacturing tolerance. Winks (1997) explained that the fit required also varies from country to country and it is important to consider the bulk of garment worn underneath. Ease allowance may also be considered in terms of the body location, type of fabric, style feature, and function of the garment (Beazley, 1999; Otieno, 2007). The values used for ease allowance of this study were based on Beazley work. Table 8.14 shows the body dimensions and ease allowance used for blouse, skirt and trouser for the trials of the developed sizes.

Table 8.14: Garment Measurements by Adding Ease Allowances

Body Dimensions	Size GHA 8	Size GHA 10	Size GHA 12	Size GHA 14	Size GHA 16	Ease Dress 8-16	Ease Trouser 8-16	Ease Skirt 8-16
Neck Girth	33	34	35	36	37	2.0-3.0		
Neck to Shoulder Point	10	11	12	13	14	-		
Front Neck point -Waist	37	39	41	43	45	0.5		
Cervical to waist	34	36	38	40	42	0.5		
Arm length	53	56	59	62	65	1.0		
Shoulder point to Elbow	29	31	33	35	37	-		
Upper Arm Girth	22	25	28	31	34	5.0-6.0		
Elbow Girth	24	27	30	33	36			
Wrist Girth	13	14	15	16	17	3.0-4.0		
Across Front	28	30	32	34	36	2.0-4.0		
Across Back	30	32	34	36	38	2.0-4.0		
Bust Girth	74	80	86	92	98	5.0-8.0		
Waist Girth	58	63	68	73	78	4.0-5.0	2.0-4.0	2.0-4.0
Upper Hip Girth	70	76	82	88	94	5.0-6.0	4.0-5.0	4.0-5.0
Lower Hip Girth	84	90	96	102	108	5.0-6.0	4.0-5.0	4.0-5.0
Thigh Girth	45	50	55	60	65	6.0-8.0	6.0-8.0	6.0-8.0
Knee Girth	30	33	36	39	42			
Calf Girth	28	31	34	37	40			
Ankle Girth	20	22	24	26	28			
Inside Leg Length	69	72	75	78	81			

(Measurements in centimetres)
*Size 12 body measurement taken from the survey conducted for this study

Ease allowance were in a range because it catered for both the smaller sizes and the bigger sizes. Bray (1970) stated that more ease allowance is required for more expansion for a wearer who is larger.

8.12.1 Height Distribution of Population

Although height is chosen as a key dimension it is not a direct body dimension that is used for preparing patterns but has an effect on vertical dimensions. The population were grouped under three height categories, namely: short, medium and tall.

Short = <Mean-Standard Deviation (SD)

Medium = Mean ± Standard Deviation (SD)

Tall =>Mean + Standard Deviation (SD)

Table 8:15: Classification of Height of the Size Chart

Category	Height (cm)	Frequency/Percentage	Minimum	Maximum
Short	<154	155 (18.4%)	145	154
Medium	154-166	529 (65.2%)	154	166
Tall	>166	105 (12.5%)	166	179

n=842

The classification of the height indicated that 529 (65.2%) of the population were medium in height, 155 (18.4%) were short and 105 (12.5%) were tall. The

remaining number 53 (3.9%) were outliers who were not catered for in the size chart.

8.12.2 Pattern Configuration

The anthropometric data was analysed using SPSS version 16. New original size charts were developed using descriptive information and correlation tests. Garment patterns were constructed manually using the measurement information from the new chart For the purpose of this study, the basic blocks for bodice, skirt and trousers of the base sizes from the size chart were constructed and digitised using the System Management of the Gerber Technology (Beazley and Bond, 2003). This process helped in translating the basic blocks that had been drafted manually into 2D patterns. This method was used to check and verify the accuracy of the patterns. Figure 8.5 to 8.8 shows the digitised patterns.

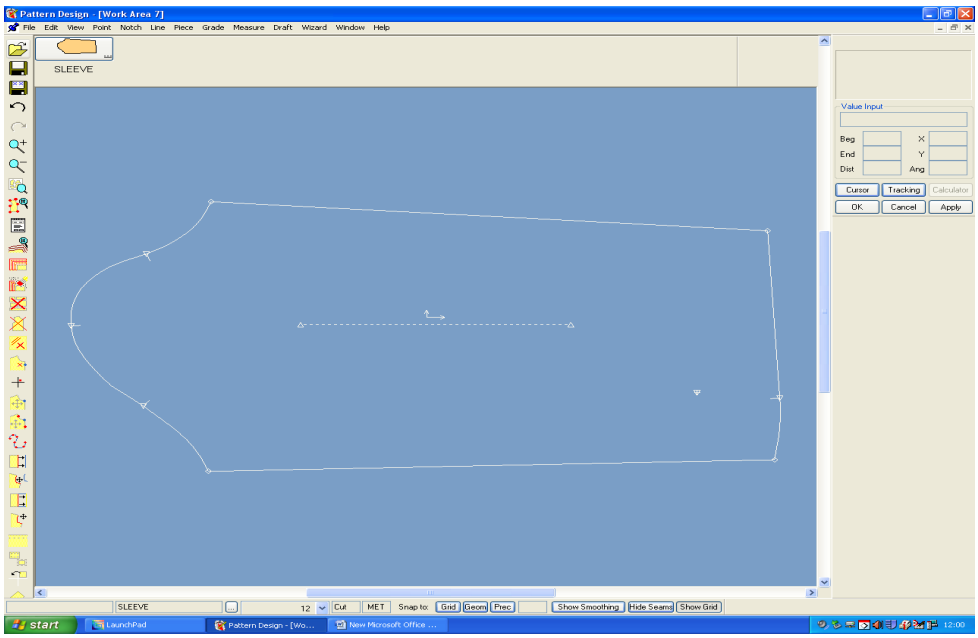

Figure 8.5 Digitised Sleeve Pattern

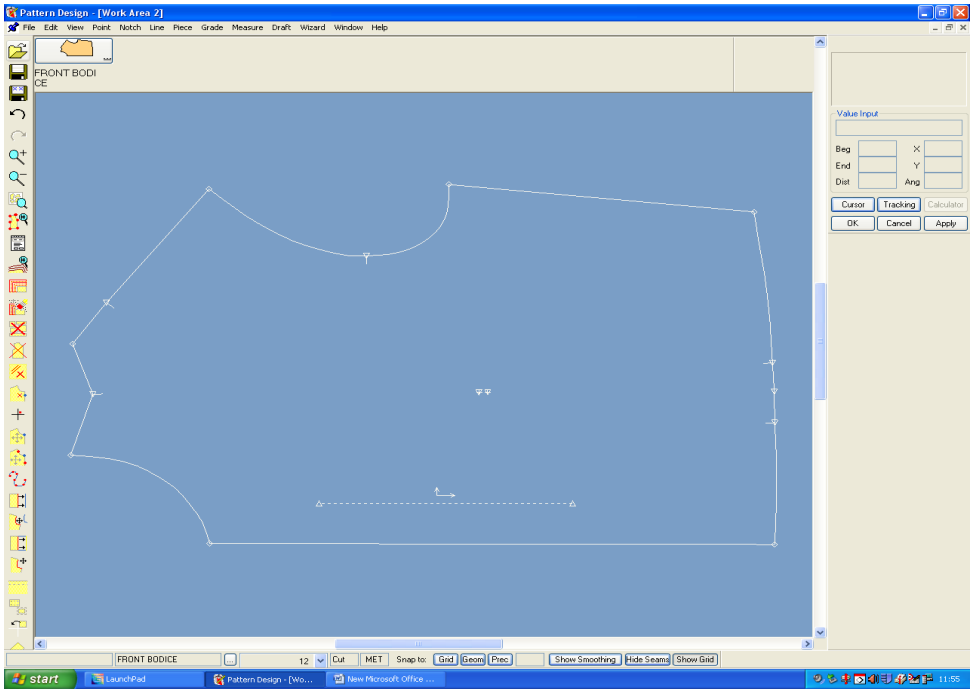

Figure 8.6 - Digitised Front Bodice

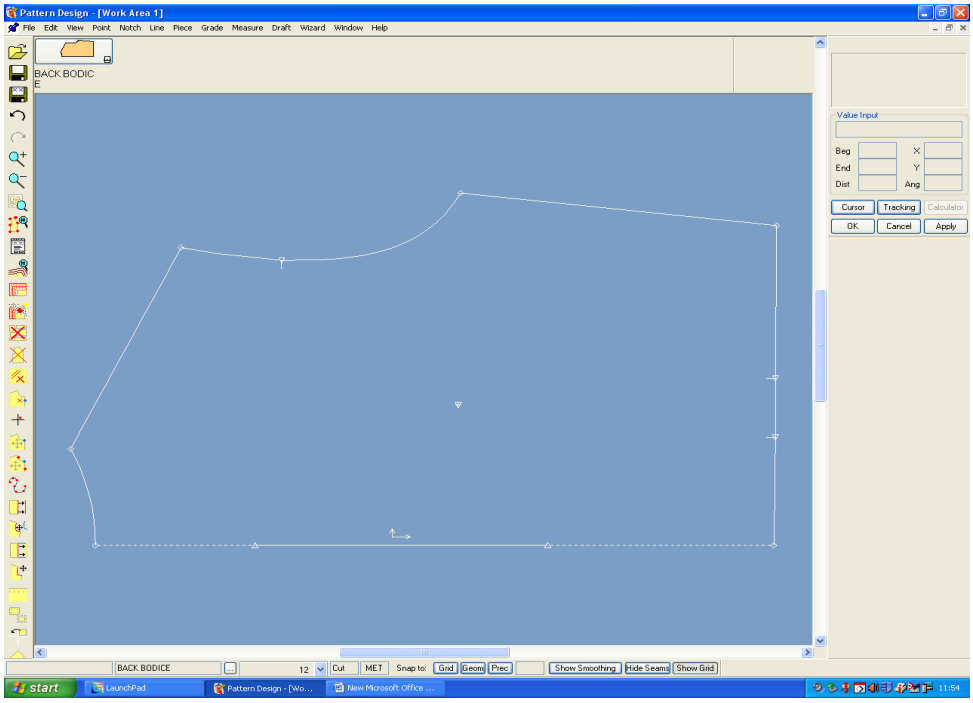

Figure 8.7 - Digitised Back Bodice

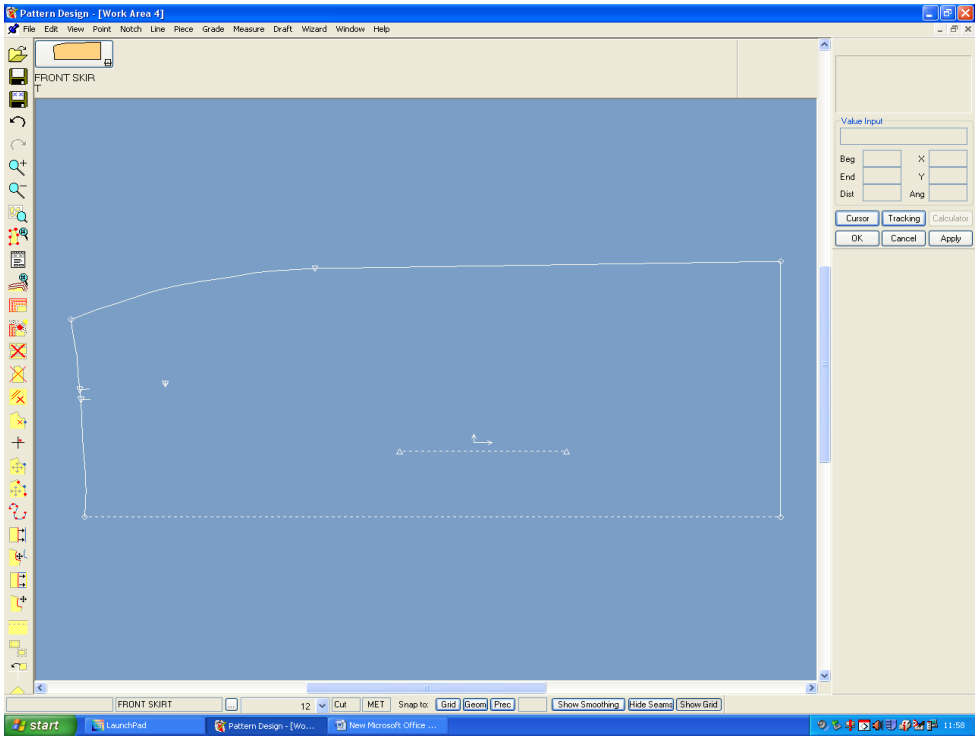

Figure 8.8 Digitised Front Skirt

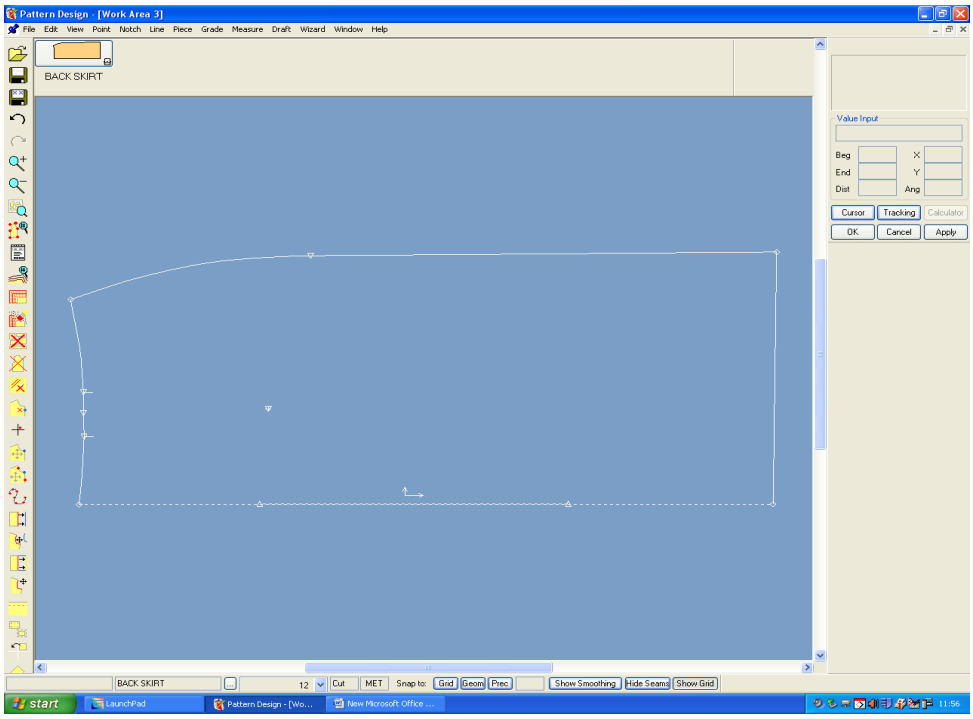

Figure 8.9 Digitised Back Skirt

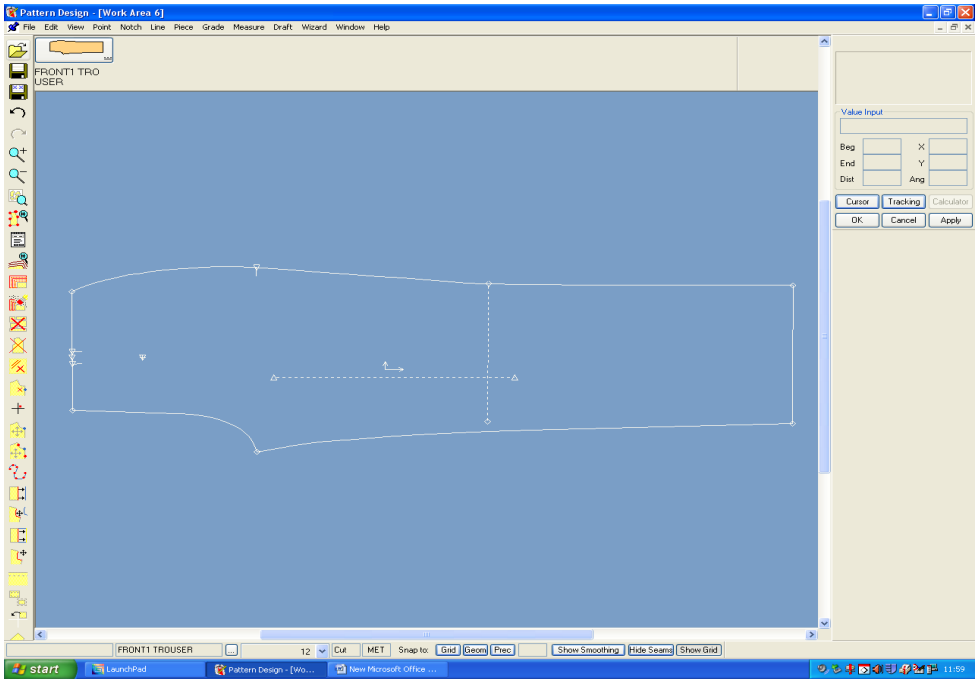

Figure 8.10 Digitised Front Trousers

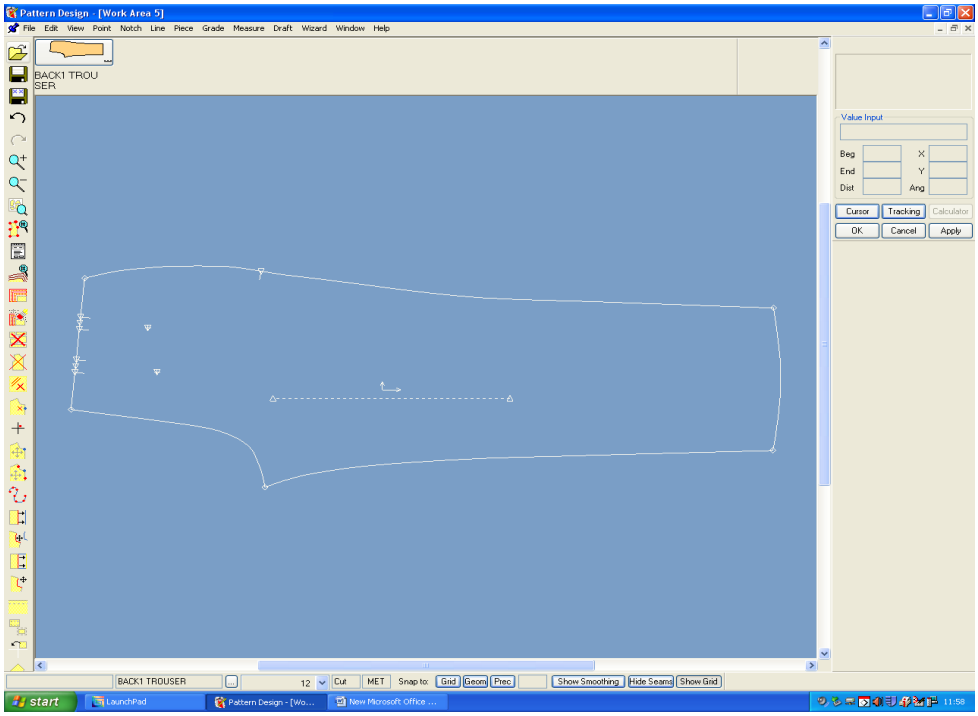

Figure 8.11 Digitised Back Trousers

8.12.3 Grading of 2D Patterns

Grading is a technique used in creating garment patterns in a range of sizes by increasing or decreasing at points of a base pattern to make it larger or smaller size based on the size chart (Beazley and Bond, 2003; Schofield and LaBat, 2005; Aldrich, 2008). In grading care is taken not to distort the correct proportion of the garment when the amount and direction of patterns are been increased and decreased. The basic blocks constructed were graded in all sizes indicated for the study GHA size 8 -GHA16. Using the Pattern Design System 2000 software package, the basic block for the base size 12 was decreased two steps down and increased two steps up to obtain the rest of the sizes. The graded patterns are presented in Figure 8.12 to 8.12.

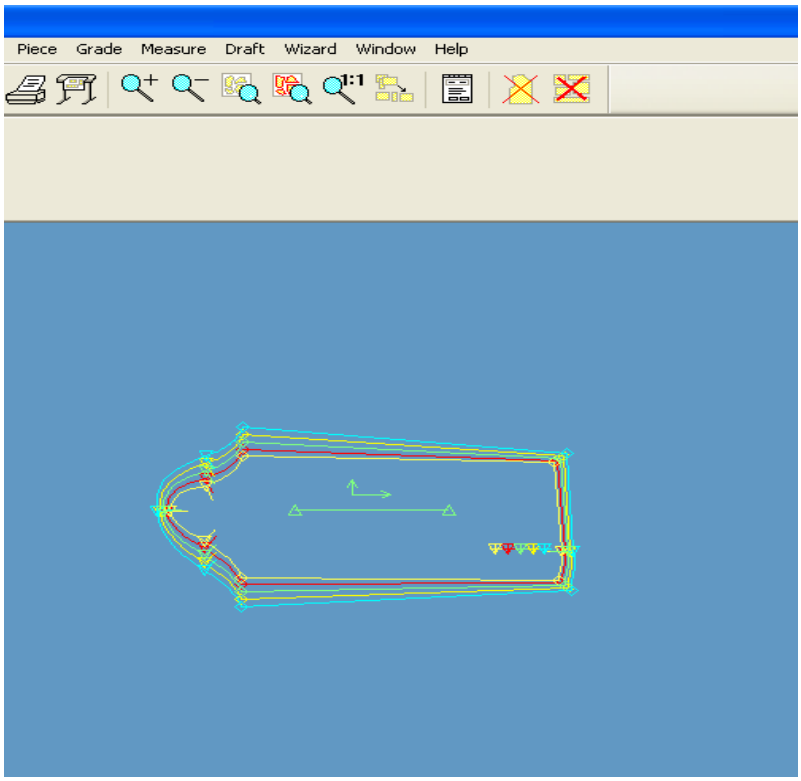

Figure 8.12 Graded Pattern (Sleeve)

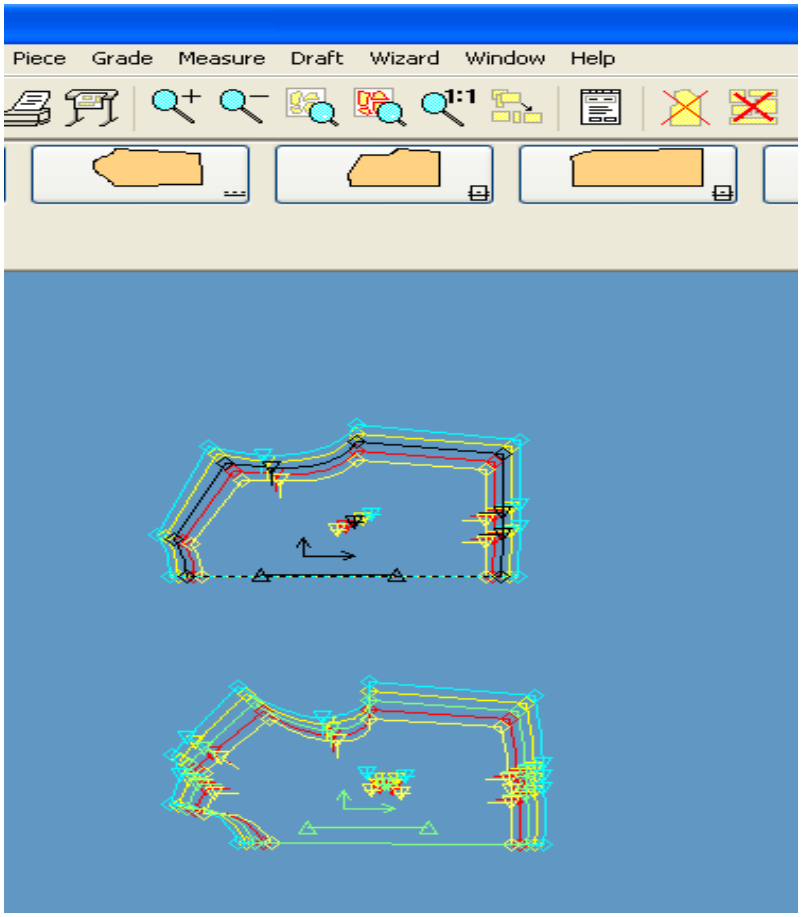

Figure 8.13 Graded Patterns (Front and Back Bodice)

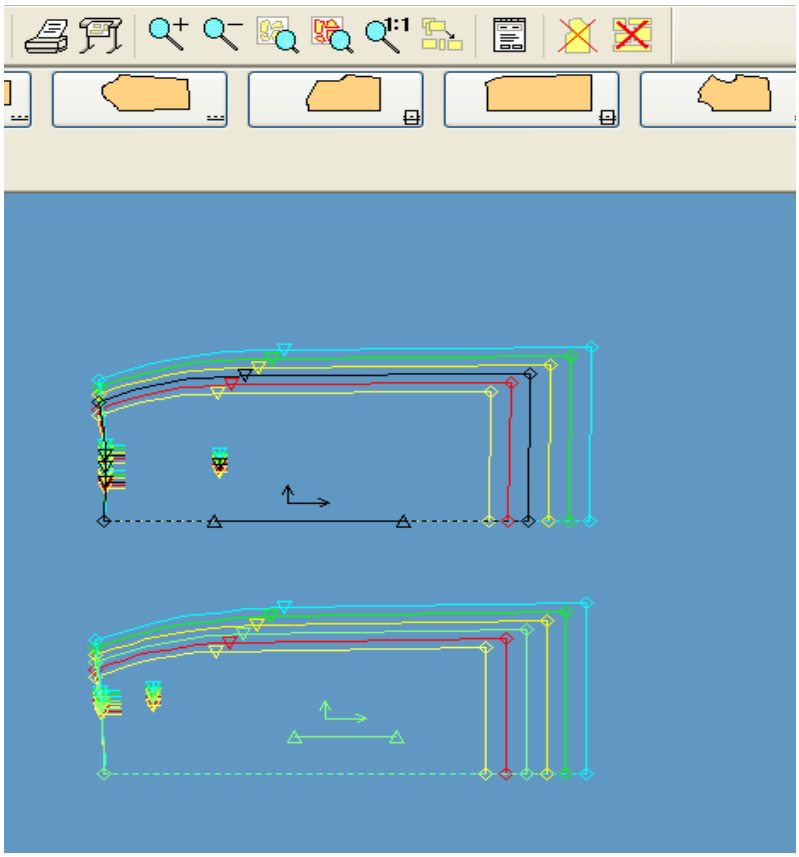

Figure 8.14 Graded Patterns (Front and Back Skirt)

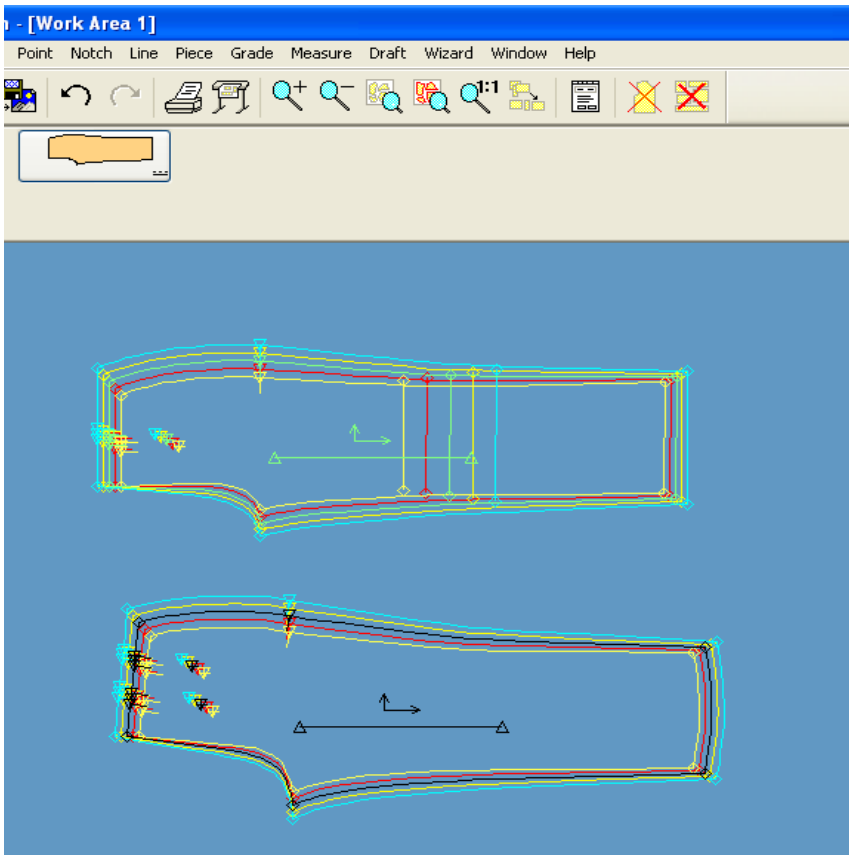

Figure 8.15 Graded Patterns (Front and Back Trouser Size 8-16)

8.12.4 Grading Rule Tables

The grade table rules developed for the grading defined the movement of the graded points. The rules were developed by using the proportions of the inter-size interval of the each body dimension, which have been presented in Table 8.16. The grading rules were prepared using the base size of the study and applying to the rest of the sizes.

Table 8.16: Ghanaian Women's Bodice Blocks

Rule Number	1		2		3		4	
Comment	No Movement		Back/Front Neck Width		Back/Front Neck Point		Back/Front Shoulder Point	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	0.00	0.00	-1.00	0.00	-1.00	0.38	-1.00	1.38
10-12	0.00	0.00	-1.00	0.00	-1.00	0.38	-1.00	1.38
12-14	0.00	0.00	-1.00	0.00	-1.00	0.38	-1.00	1.38
12-16	0.00	0.00	-1.00	0.00	-1.00	0.38	-1.00	1.38
Number	5		6		7		8	
Comment	Across Back Width		Back/Front Bust Width		Back/Front Waist Point		Back/Front Dart	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	-0.50	1.00	0.00	1.50	1.00	1.25	1.00	0.63
10-12	-0.50	1.00	0.00	1.50	1.00	1.25	1.00	0.63
12-14	-0.50	1.00	0.00	1.50	1.00	1.25	1.00	0.63
12-16	-0.50	1.00	0.00	1.50	1.00	1.25	1.00	0.63
Number	9		10		11		12	
Comment	Back/Front Hem Length		Front Shoulder Dart		Sleeve Crown		Back Sleeve Scye	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	1.00	0.00	-1.00	0.80	-1.00	0.00	0.00	-1.50
10-12	1.00	0.00	-1.00	0.80	-1.00	0.00	0.00	-1.50
12-14	1.00	0.00	-1.00	0.80	-1.00	0.00	0.00	-1.50
12-16	1.00	0.00	-1.00	0.80	-1.00	0.00	0.00	-1.50
Number	13		14		15		16	
Comment	Front/Sleeve Scye		Back Sleeve at Cuff		Front Sleeve at Cuff		Dart at Cuff	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	0.00	1.50	2.00	-0.50	2.00	0.50	2.00	0.00
10-12	0.00	1.50	2.00	-0.50	2.00	0.50	2.00	0.00
12-14	0.00	1.50	2.00	-0.50	2.00	0.50	2.00	0.00
12-16	0.00	1.50	2.00	-0.50	2.00	0.50	2.00	0.00

Revised Grading Rules

Number	17		18		19		20	
Comment	SLV Crown Revised		BLK SLV Revised		FRT SLV Revised		Dart at cuff Revised	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	-0.50	0.00	0.50	-0.50	0.50	-0.50	0.50	0.00
10-12	-0.50	0.00	0.50	-0.50	0.50	-0.50	0.50	0.00
12-14	-0.50	0.00	0.50	-0.50	0.50	-0.50	0.50	0.00
14-16	-0.50	0.00	0.50	-0.50	0.50	-0.50	0.50	0.00

Table 8.17: Ghanaian Women's Skirt Blocks

Number	1		2		3		4	
Comment	No Movement		S. Waist Back/ Front Girth		Back /Front Girth Dart		Side Waist to Hip	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	0.00	0.00	1.25	0.00	0.00	0.60	2.00	1.50
10-12	0.00	0.00	1.25	0.00	0.00	0.60	2.00	1.50
12-14	0.00	0.00	1.25	0.00	0.00	0.60	2.00	1.50
12-16	0.00	0.00	1.25	0.00	0.00	0.60	2.00	1.50

Number	5		6		7	
Comment	Side Seam at Hem		Centre/Back/ at Hem		Centre Front at Hem	
Point Attitude	N		N		N	
Size Breaks	X	Y	X	Y	X	Y
8-10	3.00	0.50	3.00	0.00	3.00	0.00
10-12	3.00	0.50	3.00	0.00	3.00	0.00
12-14	3.00	0.50	3.00	0.00	3.00	0.00
12-16	3.00	0.50	3.00	0.00	3.00	0.00

Table 8.18: Ghanaian Women's Trouser Blocks

Number	1		2		3		4	
Comment	No Movement		Waist at Crotch		Waist at Side Seam		Hip Line	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	0.00	0.00	-1.00	0.00	-1.00	1.25	0.00	1.50
10-12	0.00	0.00	-1.00	0.00	-1.00	1.25	0.00	1.50
12-14	0.00	0.00	-1.00	0.00	-1.00	1.25	0.00	1.50
12-16	0.00	0.00	-1.00	0.00	-1.00	1.25	0.00	1.50

Number	5		6		7		8	
Comment	Hem of Trousers S/Seam		Hem of Trouser Inside Leg		Crotch at Inside Leg		Front Dart	
Point Attitude	N		N		N		N	
Size Breaks	X	Y	X	Y	X	Y	X	Y
8-10	4.00	0.50	4.00	-0.50	0.00	-1.25	-1.00	0.63
10-12	4.00	0.50	4.00	-0.50	0.00	-1.25	-1.00	0.63
12-14	4.00	0.50	4.00	-0.50	0.00	-1.25	-1.00	0.63
12-16	4.00	0.50	4.00	-0.50	0.00	-1.25	-1.00	0.63

Number	9		10		11	
Comment	Back Dart		Hem TRS O.L Revised		Hem TRS I.L Revised	
Point Attitude	N		N		N	
Size Breaks	X	Y	X	Y	X	Y
8-10	-1.00	0.63	-1.00	0.50	1.00	-0.50
10-12	-1.00	0.63	-1.00	0.50	1.00	-0.50
12-14	-1.00	0.63	-1.00	0.50	1.00	-0.50
12-16	-1.00	0.63	-1.00	0.50	1.00	-0.50

Note: POINT ATTRIBUTE N- means no smoothing at the grade point (Rule Table -Bodice block, Rule Method-Increment Small to Large, Size Range: 8-16, Size Names: Numeric, Sample Size: 12, Notion: Metric)

8.13 Validation of Size Chart (Fitting Trials)

Size charts need to be validated through fitting trials to determine whether the garment designed for a specific size indeed fit the dimensional specifications (Roebuck 1995; Pheasant, 1986; Le Peachoux and Ghosh, 2002). Chen (2007) defined apparel fit as the relationship between the size and contour of the garment and those of the human body. McCulloch et al (1998) and Gupta and Gangadhar (2004) validated developed size charts by using a measure known as the aggregate loss of fit. Fitting can be conducted on prototype garments using live models or dress form, flat forms and stretch test (Le Peachoux and Ghosh, 2002; Pheasant, 1986). ASTM recommended at least 3-5 subjects for each size for fit trials. It is also important to consider the site and end user when embarking on fit trials.

Prototype garments were prepared and constructed using grey baft (calico) for all five sizes developed from the size chart. Basic garments were made from already prepared bodice blocks, skirts and trousers graded patterns for all sizes. Fifteen garments were constructed for the fitting trials. Patterns from Gerber were transferred from tracing paper on to the fabric using the tracing wheel and tailor's chalk. Measurements of the toile were cross-checked with that from the actual patterns for accuracy.

The fitting trials were conducted using live models recruited from Accra Polytechnic, which was one of the centres for the anthropometric survey (Refer to Section 8.1).Ten subjects for each size were selected for the fitting trials (Size 8-Size 16). Fifty subjects were purposively selected and recruited, all of which had participated in the main survey. The key dimensions (height, bust, waist and hip) for the study were used to select subjects for the trials. The selection was carried out after measuring the subjects again to determine the key dimensions. Thirty five subjects finally took part in the fitting trials, as this was to ensure that the expected figure is obtained. The subjects wore the prototypes garments for a period of 30 minutes.

Evaluation was made on each subject while in a standing, sitting and walking by the researcher (Le Peachoux and Ghosh, 2002). The assessment of garment fit was based on five elements: grain, ease, balance, line and set, which have been used by most researchers (Yu, 2007; Chen, 2007). An assessment form was

designed and used (See Appendix N). The researcher recorded the visual observations based on the movement of the subjects and overall fit of the garments in relation to the elements mentioned in this section earlier. The relationship between a subject and the prototype garment was therefore judged.

8.13.1 Fitting Trials Assessment and Amendments

All subjects fitted the bodice, skirt and trousers during the fit trials. The subject wore the basic garments over undergarments as the same as that used for the anthropometric survey for the fit evaluation. Table 8.19 shows the summary of the fitting trials.

Table 8.19: Summary of Fitting Trials Assessments

Total Numbers for participants who had Good or Bad Fit			
Body Dimensions	Number of Participants who had Good fit	Number of Participants who had Poor fit	Causes of Poor Fit
Neckline Position	32	3	Strain/looseness due to neck circumference
Shoulder Length	33	2	Strain/gapping at the seam position and armhole due to broad/narrow shoulder
Back Shoulder Width	32	3	Strain/gapping at the seam position due to broad/narrow shoulders
Cervical to Waist	33	2	Shortness of length due to posture and height
Front Neck Point to Waist	32	3	Shortness of waist length due to height and posture
Across Front	32	3	Strain/ gapping causing strain at the back armhole due to hollow/ fullness of chest
Across Back	31	4	Strain/gapping at the seam position and the armscye due to broad/narrow shoulders
Bust Girth	31	4	Looseness/ strain at the waist circumference due to size of breast and posture at the back
Waist Girth	31	4	Looseness/strain of waistline due to flatness and protruding of the abdomen
Lower Hip Girth	31	4	Folds/ gapping at the hip position due to hollowness at the hip circumference
Upper Arm Girth	35	0	No problems identified
Arm Length	30	5	Sleeves too long due to height
Side Waist to Knee	35	0	No problems identified
Side Waist to Ankle	31	4	Trousers too long due to height
Thigh Girth	35	0	No problems identified
Knee Girth	35	0	No problems identified
Calf Girth	35	0	No problems identified
Ankle Girth	35	0	No problems identified
Inside Leg Length	30	5	Trouser length too long
Crotch	31	4	Strain/gapping at the front due to height
Outside Leg Length	30	5	Trouser length too long

It was observed that the garments exhibited adequate ease allowance, correct seam placement, grain lines and balance. With reference to Table 8.19, it was

realised that three vertical dimensions; arm length, inside leg length and outside leg length for sizes 8, 10, 14 and 16 were long as such did not give satisfactory fit to some of the subjects. These body dimensions were amended, patterns were reworked and new garments produced. Fitting trials were conducted afterwards to verify the new body dimensions. Other problems identified were due to the variations in body contour, posture, and proportion of the individual and not necessarily on the dimensions used for the garments.

8.13.2 Consumer Perception of Fit

Garment fit is one important factor that contributes to the confidence and comfort of the wearer. Fitted clothes are considered vital to an individual's psychological and social wellbeing (Alexander et al 2005). Though fit preference may be subjective and may vary from one consumer to the other the researcher allowed the subjects to evaluate the fit of the garments based on comfort. Thirty subjects (85.7%) expressed satisfaction of the overall fit of the garments, while five (14.3%) were not satisfied with the fit particularly with the upper torsos. Body dimensions identified with problems by the subjects included shoulder length, shoulder back width, bust area, sleeve length, lower hip position, side waist to ankle and crotch length. Summary of complaints included the following;

1. Tightness and looseness at the armscye due to broad or narrow shoulders,
2. Strain/looseness of bust area due to flat chest or excessive breast and low bust point,
3. Hollowness at the hip circumference,
4. Protruding stomach at the upper hip position, bodice sleeves and trouser length due to the shortness of height and
5. Shortness of the crotch length due to height.

Some of the fit problem identified during the fitness trial may be attributed to the percentage of outliers for shoulder back width. From the point of view of the consumers it can be concluded that the overall fit assessment was satisfactory and that the size chart can be used in producing ready-to-wear clothing for the Ghanaian woman aged 16-35 years.

Amendments

Based on the assessment of the fitting trails it was recognised that three vertical body dimensions; arm length, inside leg length and outside leg length which were long needed to be amended. This was attributed to the wide variation of the standard deviation values. Table 8.20 shows the original size steps and the amended ones.

Table 8.20 Amended Body Dimensions

Body Dimension		GHA Size 8	GHA Size10	GHA Size12	GHA Size14	GHA Size16	Interval
Arm Length	Original	53	56	59	62	65	3
	Amended	57	58	59	60	61	1
Inside Leg Length	Original	69	72	75	78	81	3
	Amended	73	74	75	76	77	1
Outside Leg Length	Original	93	97	101	105	109	4
	Amended	99	100	101	102	103	1

The amendments to the size interval of these vertical dimensions were made with reference to BS EN-13403-4 (2001) as explained earlier in Section 8.7. The grading rules and tables for the sleeve block, inside leg length and outside leg length dimensions for the trouser were amended. The graded patterns were amended to reflect the new values for sizes 8, 10, 14, 16 using the grading rules. New bodice and trouser prototypes garments were constructed using grey baft based on the new graded patterns. Fitting trials were conducted using three subjects each for every size, making a total of fifteen subjects. The fitting trial was performed using the same procedure used for the previous fitting trials with particular attention being paid to the sleeve length and the trouser length, as they were the body dimensions amended. It was observed that the length of the sleeves and trousers provided a satisfactory fit for the subjects as demonstrated in Appendix O. It can therefore be concluded that the size chart developed with the necessary amendments made is much more appropriate for producing ready-to-wear clothing for Ghanaian women aged 16-35 years.

8.14 Chapter Summary

The chapter discussed the analysis of the anthropometric data used for the development of size chart for the production of ready-to-wear clothing for the Ghanaian women. Statistical test procedures were used to analyse the data. The initial information needed for the analysis was obtained from the descriptive

statistics, which determined the mean, medium, mode and standard deviation of each variable. This information was used as an average point for the development of the size chart. Co-efficient correlations determined between the variables to establish the strength of relationship between the body dimensions. Among the six body dimensions that showed high correlations with majority of the body dimensions were bust, waist, hip and height, which were selected as key dimensions for the study. The mean and the standard deviation of each variable were used in the final analyses and development of the size chart.

The development of size chart was achieved by the determination of size ranges, inter-size intervals and size codes. Based on these procedures five (GHA8-GHA16) sizes were developed. The five sizes developed were statistically catered for by using five standard deviation values. It was revealed that the average dimension obtained for the study was found to be closer to other anthropometric studies, which used the similar age groups. The percentage coverage was 88 per cent, which was found to be acceptable in the production of ready-to-wear clothing. It was revealed that the average body dimension of any anthropometric study can be determined by the age group and ethnic background.

The verification of the developed size chart was carried out by constructing five sizes each of three basic garments (bodice, skirt and trousers) for fitting trials. The garment patterns were constructed manually and digitised using the measurement information from the new size chart. Grading of the patterns was carried out using size 12 as the base pattern from the basic block. Grading table rules were then developed using the proportions of the inter-size interval of the each body dimensions. Prototypes garments were constructed for each size, which was validated through fitting trials. Thirty-five subjects were recruited and used for the fitting trials. Evaluation was made on each subject while in standing, sitting and walking positions and assessment based on five elements: grain, ease, balance, line and set. It became clear that the length of the sleeve, inside leg were not suitable for the Ghanaian women. Adaptations to the locks were made, new prototypes developed and the amendments shown to produce better fitting garments in these three body dimensions. The results revealed that although there were a small percentage of the subjects who had fit problems with some of the body dimensions, the majority of subjects were satisfied with the garment fit as indicated in Table 8.19. For the consumer evaluation it was revealed that five

subjects (14.3%) had some fitting problems with some of the body dimensions while thirty subjects (85.7%) expressed satisfaction of the overall fit of the garments.

CHAPTER 9: Discussion of Findings

9.1 Introduction

This chapter discusses the findings presented in the previous chapters (6, 7 and 8) in light of the first three research aims outlined in Chapter 1, Section 1.4. The analyses of the findings were explored in order to develop a conceptual framework outlined in the fourth aim of the study. Topics discussed are in two phases. Phase one contextualises sources of sizing systems, development of national sizing system, clothing standards, government policies and the clothing Industry in Ghana. Phase two synthesises the body shape, body size, body cathexis and clothing choice, the evaluation of size charts for Ghanaian women and the development of a conceptual framework.

9.2 Discussion of Findings from Interviews and Focus Groups

The first phase of the study investigated the current sizing systems used for ready-to-wear in the clothing industry in Ghana (Aim 1). Interviews and focus group discussions were conducted with three different groups namely; manufacturers, stakeholders and clothing consumers. The three parties shared similar views on the themes discussed. This was investigated under the themes of sources of sizing systems, variation of sizes, coding and labelling of garment sizes and development of national sizing system.

9.2.1 Source of Size Charts

Previous literature indicates that size charts are key factor for the production of ready-to-wear clothing (Tamburino, 1992; Winks, 1997; Yu, 2004; Schofield and LaBat, 2005; Aldrich, 2007). The use of size charts in the clothing industry has resulted in the surge for both large (O'Brien and Shelton, 1941, size UK, size USA, the CEASAR project) and small (Tamburino, 1992a; Beazley 1997; Ashdown, 1998; Gupta and Gandaghar, 2004; Vronti, 2005; Schofield and Labat, 2005; Otieno, 1998, 2008; Yu, 2007; Petrova, 2007; Kuma-Kpobee, 2009) anthropometric surveys in recent years. While various countries have developed their own size charts based on their populations (USA, UK, Sweden, France, Germany, New Zealand, Australia, Canada, South African, Korea, Japan, India China, and many others), a universal size chart (International Standard, ISO, 8559:1989) has also been developed. This study established that there has been

no official national sizing system, published within Ghana. The findings of this study indicated that due to the absence of national size chart, the clothing manufacturers have adopted and/ or modified size charts from various sources in particular; the International Standard (ISO, 8559:1989), the British Standard and the American Standard. The findings also illustrate that some manufacturers have created their own internal size charts to their specific consumer body measurements. From the findings, the suitability of the various size charts for the target market informed the decision manufacturers made toward the use of a particular size chart. This study showed that companies producing for the younger women adopted the British standard and those for the older women adopted the American standard. This was deduced from the age target and size chart options of the individual companies interviewed.

Throughout the investigation, it became evident that there were variations in the clothing size in the Ghanaian market. The different source of the size charts was identified as the main cause for the non-uniformed or non-standardised measurements used by the clothing industry. This finding corresponds to the findings of other studies that variations in size charts can be attributed to manufacturers assessing body dimensions differently based on their own standards and what they want to achieve (Tamburino, 1992a; Cooklin, 1992; Faust et al., 2010). Further to this, the findings indicated that the processes used for fabric cutting was directly related to the variations in the sizes of garments. It also became clear that other practices that affect sizing include freehand cutting method without patterns, manual cutting method due to non-availability of industrial cutting machine and finally the understanding of the size chart during the sewing process. The findings revealed that the level of understanding of sizing issues by various employees may have contributed to the variations in sizes especially when adding ease allowance to various sizes.

Researchers have identified size labelling as a contributing factor to dissatisfaction at the customer level. Many studies have focused on this subject (O'Brien and Shelton, 1941; Workman, 1991; Tamburino, 1992a; Chun-Yoon and Jasper, 1993; Winks, 1997; Beazley, 1997-1999; Ashdown, 1998; McColluch et al 1998; Workman and Lentz, 2000; Anderson et al., 2001; Istook and Hwang, 2001; Faust et al., 2006; Faust and Carrier, 2010). The findings confirmed that manufacturers have used different size codes to designate sizing of ready-to-wear clothing, which

has tended to be a source of frustration for many customers. These findings correspond with the conclusions of other studies (Tamburino, 1992a; Faust et al 2006). This study illustrated that Ghanaian clothing manufacturers code their garments using alpha numerical (example S, M, L, XL), or numerical or both (6, 8, 10, 12 etc.). It was evident that these standard size labels are meaningless to the consumer because they do not provide information about body dimensions especially the key dimensions (bust, waist and hip) and the body shape on which the size was based on. The finding concurs with Chun-Yoon and Jasper's (1996) statement that size labels are designated to provide information allowing consumers to select the correct size but instead the consumers become confused and frustrated if size designation does not have a true representation, leaving them with great variations in size identification.

Workman and Lentz (2000) acknowledged that each manufacturer independently decides on the measurement specifications and size designations for its prototype body. As revealed in this study manufacturers who coded garment using the alpha numerical system, label them beyond extra small and extra (extra) large. Most of the manufacturers who use numerical codes have sizes ranging from size 10 to size 26. Others range their sizes from size 6 to size 30. It is evident that manufacturers who use the alpha numerical method of coding produce more loosely or semi fitted garments than those who use the numerical method. It was established that manufacturers who produce more loosely or semi fitted garments design their garments using more of the Ghanaian traditional design concepts.

9.2.2 Development of National Sizing System

It was revealed (Matthews, 1979; Dogbe, 2003) that new values, social institutions, changing roles and globalisation resulted in the increase in the use of Western clothing particularly ready-to-wear clothing in Ghana. Ready-to-wear clothing production has proved to be the most reliable and fastest way of production in the clothing industry. The three parties involved in this study acknowledged that although the ready-to-wear clothing market in Ghana has not seen as much growth as other countries it has improved in terms of the quality of products over the years. The most pressing issue facing the industry now is garment sizing. This study evaluated the views of the manufacturers, stakeholders and the consumers on the development of national sizing system, obtained

through interviews and focus group discussions. The findings confirmed that most of the garments are produced using modified or revised overseas size charts. It became evident that size charts adopted from other countries as discussed in this chapter in Section 9.3 of this chapter are not always suitable for Ghanaian women because they need to be modified. Several studies indicated the need to develop size charts that relate to the intended population. This finding corresponds with Otieno (1999) and Vronti (2004) statements that size chart must be developed to cater for the specific needs of a particular population. During the various interviews, it was revealed that the numerous garment fit problems experienced by consumers are mostly associated with the different size charts used by the manufacturers. This corresponds with the findings of LaBat and DeLong (1990); Alexander et al (2005); Pisut and Connell (2001) and Kinley (2009) that one factor that may contribute to women's dissatisfaction with their bodies is that fashionable clothing reflects a standard sizing which is not realistic to the entire women population.

It became clear from the study that most of the clothing companies who fall within the small and medium scale categories, target a smaller section of the market, the African communities in Europe and America markets and therefore they are not so much concerned about a national size chart. This explains why the individual companies have compiled measurements taken from their customers and used them to develop body measurement charts which are appropriate to their specific market. This corresponds with the study of Alexander et al (2005) who argued that the reason why apparel companies do not follow a standard sizing system is because different firms have different target populations of women whose lifestyles, incomes and body shapes differ. In a broader situation where companies have a larger market the use of national size chart will be more practicable as it will relate well to the body shape of majority of potential consumers.

Furthermore, the findings revealed that all the three interested parties (manufacturers, stakeholders and consumers) indicated that the industry need suitable garment sizes when producing garments and should give consideration to other related factors such as style lines, stitches and finishes to enhance products and boost the patronage of the locally manufactured products. The findings revealed that one manufacturer did not agreed to this view upon the basis that the size chart will not cover the majority of Ghanaian women because of the vast

variability in the body shapes. It was suggested that the adopted size charts from other countries should be made practicable for use rather than developing one for the country. The findings from the focus group further showed that Ghanaian women have the perception that their body shapes are different from women in other continents. The participants expressed that it was long overdue for the country to have sizing system similar to the European countries, Americans and the Asians. Following the findings from this study, that the Ghana Standards Board has adopted the International Standard on sizing for women's wear (ISO. 8559:1989), the institution therefore has the responsibility to collaborate with the government and other stakeholders to develop a size chart based on the Ghanaian women to make the standard practicable. This study contends that it is important for the country to develop its own sizing system in order to improve on the output of the local market and the growth of the clothing industry. This positive result corresponds with other studies on the development of sizing system (Beazley, 1997&1998; Ashdown, 1998; Otieno, 1998 & 2008; Gupta and Gandaghar, 2004; Vronti, 2005; Kuma-Kpobee, 2009).

9.2.3 Clothing Standards and Government Policies

Product quality is one of the primary determinants of the competitiveness of manufacturing firms (Dinye and Nyaba, 2001). The findings showed that nine standards (See Chapter 6 Table 6.8) have been adopted from the International Standard by Ghana Standard Boards as a guide to help the clothing manufacturers. The findings of this study confirmed that the majority of manufacturers were not aware of any clothing standards and for the few who knew, they did not conform to the requirements of the standards. This illustrated that little has been done in the implementation and re-enforcing of these standards. It was evident from this study that government policies or laws to enforce and make these standards mandatory are not in place and therefore the Ghana Standards Board finds it difficult to reinforce these standards. It was evident that the Board in some cases do not have the right equipment, and expertise to help in their operations. This finding concurs with Dinye and Nyaba's (2001) finding that the Board lacks the financial and human resources to live up to its mandate of encouraging industry to observe a set of standards. They concluded in their findings that the Board with little capacity for enforcement, its attitude towards the promotion of standards is, therefore, passive. It was evident

that the absence of re-enforcement of the clothing standards for products produced for the local market has resulted in low quality of product and sub-standards goods finding their way on the local market. On the contrary, this study revealed that garments produced for export trade are checked to ensure that they meet the requirements for export. The majority of participants are of the view that the industry will experience growth if standards set are enforced in clothing companies at local and national levels.

The findings further indicated that some of the trade policies by the government have not been favourable to the clothing industry, since it has led to the influx of textile products, ready-to-wear clothing and used clothing, which has adversely affected the clothing industry. Although trade liberalisation made it possible for domestic manufacturing firms to gain access to otherwise scarce material inputs and equipment, it also intensified competition from imported products (Dinye and Nyaba, 2001). From all indications, trade liberalisation cannot be stopped but the stakeholders specified that there is the need for government to regulate trade liberalisation by making provision to protect the local companies. The findings concurs with Dinye and Nyaba (2001) study that entrepreneurs do not object to the trade liberalisation policy but rather worries about the dumping of sub-standard goods produced in Asian countries in Ghana.

With regard to taxes, findings indicated that the introduction of some taxes (import tax, corporate tax, and VAT) affected the clothing industry. Participants demanded that the government should grant benefits for those producing for the local market just like the ones obtained by manufacturers exporting their products to countries like USA under the African Growth and Opportunity Act (AGOA) scheme. Ampofo (2002) stated in his study that the tariff structure is being revised to conform to current economic trends, with this, proposals have been made to increase import duty on all imported textiles and used clothing to bridge the gap between locally manufactured textiles and imported textiles and garment. The findings exhibited that the future of the clothing industry depend largely on government policies, her intervention to strengthen the industry, support to the textile and clothing industry in the form of bank loans, importation of raw materials and also regulating the inflows of foreign goods competing with the local products. This result expands findings of (Quartey, 2006), which indicated that recent proposal by the

government of Ghana to establish an Economic Intelligence Unit to arrest and punish those engaged in trade malpractices is timely.

9.2.4 The Clothing Industry in Ghana

The findings gathered from the three parties showed that the clothing industry has grown in terms of size, as many Ghanaian entrepreneurs have invested in the industry, the quality of products has been improved and patronage has increased. Findings revealed that the clothing industry is labour intensive industry with relatively fixed capital, which has allowed easy entry by new entrepreneur who have the flair for design, a niche in the market, some working capital, but a small amount of fixed capital. It is to be noted that there has been improvement in telecommunication system. The findings demonstrated that the majority of companies now have access to telephones, internet facilities and website to transact business for instance promoting and marketing their products. It was revealed that the greater percentage of ready-to-wear clothing companies interviewed comprised of micro-small and medium scales. A few of the companies who were large-scale manufacturers produced a greater percentage for export trade and a smaller percentage for the local market. The result is a true reflection of the composition of the clothing companies in Ghana (See Table 6.1 in Chapter 6). The majority of these companies were privately or jointly owned family business but the government of Ghana owned none of these clothing companies.

In terms of machinery, all the companies were using industrial machines for sewing, decorating and finishing. Only the companies classified under the large-scale category had industrial cutting system and computer aided design (CAD) systems for grading patterns to facilitate production. This situation was attributed to the investment capabilities of the small and medium scale companies. This study concurs with findings from Fianu and Zentey (2000) study, which stated that the type and quality of machines used in the Ghanaian companies hinders the companies from producing on a large-scale and meeting the quality and delivery time. Abernathy (1999) and Keenan et al (2004) indicated that in the competitive market where demand and time to the market have become important times calls for the use of new and emerging technology. This study therefore recommends the need for a source of capital to invest in modern machinery and expertise to enable

the companies meet the demand and a standard of today's world is paramount to the development of the clothing industry.

The study indicated that most companies focus directly on the design aspect to the extent that, they do not put much effort into the production, marketing and distribution thereby failing to expand their companies. It became evident that for an effective operation, companies, which do not have the expertise and machinery for all aspect of production, could team up with other local companies to produce quality products. This finding concurs with Cooklin (2006) study that the variety of garment types produced to allow the production itself to be carried out by one or two types of organisation is likely to be globally dispersed with the assembly stage located in low labour cost countries. It was suggested that the country's strategically position in the sub-region, is an advantage for the industry to focus on mass production in order to trade in these nearby countries.

With regard to human resources, some of the manufacturers and consumers indicated that education and training of individuals for the industry was an area that needed attention. It became evident that educational policies should be restructured to address the need of the industry such as establishing the right training centres, colleges and universities. Although the majority of manufacturers do not have the skills to operate industrial machine patronage for the training centres set up by the government of Ghana to equip clothing manufacturers has remained very low. On the contrary, the stakeholders and the some manufacturers strongly opposed the statement that the clothing industry does not have enough trained personnel. They justified this view by pointing to the fact that the country's vocational centres, polytechnics and some of the universities offer clothing manufacturing courses which prepare their graduates for the industry. It is evident from the findings that the gap between the industry and the education provision has resulted in unskilled graduates from these institutions. Cooperation between the industry and the institutions on training of prospective labour is inevitable.

It was generally accepted that there has been improvement in the patronage of locally made ready-to-wear but there is still more to be done. All the groups were of the view that there should be a change of attitude, perception, and judgment of Ghanaian consumers on made-in-Ghana products. The study revealed that the acceptance of the locally made goods would boost patronage thereby helping the

industry to grow. The findings showed that product pricing has become an issue affecting patronage of local products. This study indicated that there is no pricing system in place and cost incurred during production are pushed to the consumer thereby making products very expensive for the income of the average Ghanaian.

This study revealed that the companies have positioned themselves in the market by advertising through trade fairs, exhibitions, catwalks and fashion shows. The current trends in promoting and advertising for most companies have been through business card, brochures, websites, and the media in the form of sponsoring charities, sponsor TV presenters and other programmes that market the companies produce. This is in line with Glock and Kunz (2005) statement that companies develop and promote the image of their companies and their product lines, optimise sales opportunities, and develop strategies for corporate growth. The findings further demonstrated that participants have assessed information through fashion programmes on television and internet, magazines, catalogues and participating in international fairs. Some of the participants confirmed that they conduct market research through the internet and market survey to keep abreast with new trends. However, this is another area that could be supported by the stakeholders.

It was evident that most of the companies find it difficult to sell their products through the wholesale and retail marketing channels. The ready-to-wear clothing market in Ghana is not as established as the developed countries. Unlike the developed countries where there are a number of ready-to-wear clothing retail shops, there are a few high street shops and shopping malls to accommodate products from various companies. Companies sell through their own retail outlets, which are often limited to a particular location. This has resulted in companies not producing to their full capacities and preventing growth to large scale clothing manufacturers. Companies have nonetheless created their own marketing strategies to help sell their output. The participants outlined these marketing strategies such as direct sales to customers and small shops owned by individuals. All participants acknowledged that they use their own retail and wholesale outlets, some attached to their company premises, and others situated at vantage points in the cities.

It was evident from the findings that Ghanaians have the notion that ready-to-wear clothing is expensive because the boutiques and other shops that sell them are thought of to be for the affluent in society. The situation of the market has not changed much because the prices of most of the ready-to-wear clothing are beyond the lower income Ghanaians who form the majority of the population. The consensus of all the parties is that the clothing market needs restructuring so that manufacturers will be able to produce quality products in larger quantities to reduce the retail price. The findings from the interviews indicated that the sustainability of the industry depends on the support the government will give to the industry. This should be in the form of financial support, tax relief on the importation of raw materials, and implementation of policies that will help the local industry develop.

9.3 Discussion of Findings of Focus Groups and Questionnaires for Consumers

The second phase focuses on the evaluation of consumer perception relating to body shape and size, body cathexis and their effect on garment choice (Aim 2). This was conducted through focus group discussion and questionnaires survey for clothing consumers.

9.3.1 Body Shape and Body Size

Many studies have focused on body shape and body size of women (Jourard & Secord, 1955; LaBat & DeLong, 1990; Alexander et al., 2005). Research has established that the average woman's body keeps on increasing and resulting in changes in the body shape (Garner, 1997; Prevos, 2005). The findings revealed that changes in women have been attributed to various factors, for example, hereditary, lifestyle, diet and socio-cultural issues and have affected how the individual interprets and perceives the body shape. This study illustrated that although body shape may be inherited, women may appear smaller, bigger, or average size depending on their lifestyles. This corresponds with findings of Tamburino (1992b) and Chen and Swalm (1998) that the changes are due to factors such as excessive dieting, lifestyles, social and cultural values combined with heterogeneous ethnic mix.

Findings of the study provided evidence that images portrayed by the media, especially in films, clothing models, clothing magazines, catalogues, celebrities and actresses are presumed by most women as the ideal body shape. Many studies have pointed out that the media has been the main source of influence on the perception women have towards their bodies (Robinson, 2003; Kinley, 2009). This study demonstrated that Ghanaians sense of ideal shape is subjective to the views of the society. In a similar study Robinson (2003) reported that the individuals attempt to alter their appearance, to resemble cultural aesthetics ideals is believed to be a result of social identity, the culture becomes the aesthetic standard for the individuals to create their appearances against which individuals compare themselves. Findings from this study indicated that the perception of the individual on ideal shape in the Ghanaian context was closer to that of the hourglass and the triangle shapes. The majority of participants who chose these two shapes body measurements met the description of the shapes illustrated by Simmons et al (2004). The general perception of participants for the focus group discussion was that the triangle shape is associated with the African figure whiles the hourglass is associated with the Western women. On the contrary findings have revealed that the shape of western women are mostly rectangular and spoon in shape (Alexander et al, 2003 and Fu, 2004; National Textile Center Report: November 2005). The findings from the questionnaires analysis showed that the majority of respondents indicated higher scores for hourglass shape 48.6% and triangle shape 33.3% showing 81.9%. The other four shapes recorded a minimal percentages each; rectangle 6.0%, diamond shape 4.5%, inverted triangle 3.9% and rounded 3.7% recorded a minimal percentages. It was established that the respondents demographics did not have any impact on the (age, marriage, income, education and occupation groups) choices of body shape made by the participants because there was no significant difference between the groups.

9.3.2 Body Shape and Body Image

Borland and Akram (2007) concur with Grogan (1999) and Halliwell and Dittmar (2003) that body image is a multifaceted construct that consists of perceptual, affective and cognitive components. Various researchers (Jourard and Secord, 1955; Thompson and Gray, 1995; Demarest and Langer, 1996; Garner, 1997; Turner et al., 2003; Alexander et al., 2004; Cash et al., 2005) have studied body image extensively. They have argued that an individual's view of her body image

can be influenced by media images, which idealise slim young, successful women while providing negative stereotypes of obese older figures. Dawson-Andoh et al (2010) concurs with Gordon (2008) that the mainstream media has long promoted images of women as young, thin, tall, and white. The findings of this study revealed that the body image depends on how an individual perceives herself in relation to what society accepts as standard body shape. This corresponds to Fallon's (1990) findings that body image includes a woman's perception of social standards, how she matches the standard, and the perception of the relative importance that members of society place on that match. Furthermore, it became evident that body shape and size may have positive or negative effect on a person's image, which is consistent with Jourard and Secord's (1955) statement that the negative body image can undermine a person's general self-concept, just as the positive image can enhance one's image. The findings demonstrated that an individual may withdraw from others and avoid the public, be frustrated and embarrassed resulting in self-pity, changing mood and behaviour and increase in health problems. This study indicated that many Ghanaian women would take in various foods or drugs that could make them gain weight in order to look plump or fleshy just like what the society expect as an ideal shape to the detriment of their health. The findings showed that the individual creates an appearance that is similar to the cultural ideal of a group of people. This finding is in direct contrast to (Borland and Akram, 2007) findings where women in the Western countries would embark on excessive dieting and exercising, grooming and which may result in more dangerous bio-psychological disorders such as anorexia nervosa and bulimia to become slimmer in order to meet the societal standard.

It is evident that in certain societies slim attractive women are seen as ideal shape and in others particularly African plump women are seen as attractive women. It can therefore be deduced that what is referred to as an ideal shape may be dictated mostly by the society one lives. There was an indication that the Ghanaian community may not accept a slim woman as their ideal woman's shape but women who are plump. This result reflects the views of Dawson-Andoh et al., (2010) that African American women generally prefer larger ideal body sizes, are more tolerant of a variety of body sizes, and feel attractive with higher weights than Caucasian women. This study also established that the influence of other cultures, education, communication and religion have had a great impact on the perception of ideal body shape on most women in Ghana especially the younger

generation. These factors have contributed to how they perceive their bodies in recent times.

9.3.3 Satisfaction and Dissatisfaction of Body Shape

The focus group discussions and the questionnaire survey of this study revealed that the areas of the body with the greatest satisfaction were the bust, buttock, thigh and hip. Consumers expressed dissatisfaction with waist, arm, shoulder and calf. This finding contradict findings of the following researchers whose studies were based on western women (LaBat and DeLong, 1990; McAllister & Caltabiano, 1994; Robinson, 2003; Alexander et al., 2005) who stated that majority of the women were dissatisfied with the waist, hip and bust. The participants who were dissatisfied with their hips, buttocks, and calf were those who had smaller dimensions and would prefer larger ones. Findings from the focus group discussion correspond with the responses from the questionnaire survey that married women were less satisfied with their waist than unmarried women and this may be related to childbirth. Others who had bigger arm and shoulders were dissatisfied with these parts of the body. This study showed that the Ghanaian women may prefer larger hips and buttocks but would want to have smaller shoulders and arms. It is evident that the majority of the Ghanaian women are satisfied with the lower part of the body but dissatisfied with the upper part of the body. This finding differ from the way western woman feel towards her body (Jourard and Secord, 1955; Rosen and Ross, 1973; LaBat and DeLong, 1990; Alexander, 2000; Robinson, 2003) as these studies showed that majority of Caucasian women dislike the lower body (pant length, crotch, thigh, hip and buttocks).

9.3.4 Body Shape and Clothing Choice

This study found a relationship between body shape and clothing choice. It was indicated by the participants that body shape has a direct influence on the choice of garments. The results revealed that garments are chosen based on its suitability and appropriateness to a specific body shape. It was acknowledged that not all garments may appear the same on different size bodies and this may result in fit problems. This finding corresponds with Petrova (2008) findings that the same garment will fit differently on two people with identical key measurements if their

bodies are shaped differently. The study concluded that what is perceived as a well-fitted garment may provide different results for women with the same size but with different body shapes. It was indicated that even though most women may choose garment that might compliment their body shapes and give a degree of satisfaction of fit, some others may decide to follow fashion trends, which may not be suitable for their body shapes. With this women may not appreciate their body shapes and may assumed that they have some degree of defects depending on what type of ready-to-wear they choose. This finding concurs with the study of LaBat & DeLong (1990) which indicated that women expressed disappointments with fit of clothing as discontentment with their bodies and one factor that may contribute to the dissatisfaction with their bodies is that fashionable clothing reflects a standard sizing, which is not realistic. It was evident from the findings that women may choose only garments that will make them appear attractive therefore avoiding any garment that will emphasise the bad areas of the body. Garments may be used to emphasise or de-emphasise parts of their bodies. For a person to be satisfied with the body shape, garment need to be selected with much consideration.

This study indicated that the types and features of a garment can have direct influence on the body shape. The choice of colour, style, fabric design, accessories and stitches were the garment features that were identified by the participants as having effects on the body. In the Ghanaian cultural context, the choice of certain garments may be dependent on the colour and motif of the fabric in relation to the occasion. Dogbe (2003) study revealed that the choice of garments is influenced by the socio- economic and cultural factors. The majority of the participants share the view that a garment should be able to compliment the body shape of an individual.

This study revealed that body shape may limit the individual's clothing choice by restricting one from choosing a particular type of garment. For example, those who were dissatisfied with their waist and abdomen do not choose fitted dresses and those who had big bust may have gape in front of their jackets and blouses. As discussed earlier in this section there can be numerous factors to consider when choosing garment in relation to body shape. One may desire to wear particular ready-to-wear clothing but the body shape may not give a good garment fit thereby depriving the individual from wearing that particular garment. It was revealed from

the focus group discussion that most women are not conscious of their bodies and it is recommended that women should study their body shape in order to reduce the tendency of wearing clothing that expose their body weakness.

9.3.5 Body Cathexis and Clothing Choice

Studies investigating body cathexis have focused mostly on western women (Rosen and Ross, 1973; Jourard and Secord, 1955; Pisut and Connell, 2006). Report shows that women with a decreased body cathexis have a higher dissatisfaction with the fit of ready-to-wear, especially the lower part of the body (LaBat and DeLong, 1990; Alexander et al., 2005). The finding of this study revealed that most of the participants were satisfied with some areas of their bodies when in a clothed state but expressed their dissatisfaction of the same parts of the body when in an unclothed state. These differences demonstrated that clothing influences the feeling women have towards their bodies. Feather et al. (1997) concurs with Markee et al. (1990) that clothing has the potential to improve individual's body satisfaction because females evaluate their bodies higher when clothed rather than unclothed state.

The findings from the questionnaire on the body cathexis, indicated higher scores of satisfaction for all body areas and respondents than those who were dissatisfied. The high percentage of satisfaction of responses demonstrated that Ghanaian women appreciate their bodies irrespective of their physical appearances. This study concurs with Feather et al (1997) that the African American women are more satisfied with and have positive feeling towards their bodies and less dissatisfaction than the Euro-American woman.

Furthermore, the demographics of the respondents were explored in order to establish how satisfied or dissatisfied the respondents were with their bodies. The findings revealed significant differences between the choices made between the age, marital and childbirth status groups for the body areas used in the study. There were differences between the younger and the older age groups for the level of satisfaction for bust, abdomen, waist, hip, thigh and weight. This may be attributed to the fact that the younger respondents may appreciate their bodies because they may have curvaceous shape than the older respondents as it is assumed that the body changes when one becomes old (Gupta, 2004). It is

evident that the younger ones were more satisfied with these parts of the body than the older ones and this corresponds with the findings of the focus groups.

With regards to marital status, it was evident that there were significant differences in the responses between the married and unmarried groups. These differences were seen for the satisfaction of the neck, arm, shoulder and waist body areas. Similarly, there were differences between those who have given birth and those who have not with the responses for the waist, abdomen, weight, legs, neck, areas of the body and the overall appearance. Respondents who were not married and did not have children indicated greater satisfaction with the body areas than the older respondents who were married and had more than one child. This supports the findings from the focus group discussions. In the case of occupation, income and education, the result indicated no differences between respondents with respect to the satisfaction with their bodies.

In terms of body cathexis and body shape, the differences were seen in the legs, buttocks, abdomen, and shoulder among the six body shapes (triangle, inverted triangle, rounded, diamond, hourglass, and rectangle). Since majority of the respondents chose hourglass and the triangle there were not much difference between their choices. Alexander et al (2005) stated that the degree of satisfaction with different body areas depended on the body type of the individual. The level of satisfaction of body areas were however significant with the choices made for the following body areas: legs, buttocks, shoulders and abdomen between the triangle, hourglass, inverted shapes and that of the rectangle shape. The results showed that respondents who chose the diamond shape have higher rate of dissatisfaction.

From the results it can be deduced that the level of satisfaction for all the body areas differ from one shape to the other. In order to ascertain how a particular shape should look like the key dimensions (bust, waist, and hip) were used to determine the individual shape category as used in the study of Simmons et al (2004). From the findings, the level of satisfaction of the bust, waist and hip for those who chose the triangle and hourglass were higher than those who chose the inverted triangle, diamond, rounded and rectangle. The lower scores of satisfaction for the bust were those who chose the rectangle, for the waist were those who chose the rounded and for the hip with those who chose the diamond.

In addition to the three key dimensions the level of satisfaction for the abdomen for those who chose the diamond was considered. The findings demonstrated that respondents with diamond shape were the least satisfied with the abdomen which corresponds with the findings of Simmons et al (2004) that the person with a diamond shape is characterised by having several rolls of flesh in the midsection of the body that protrude away from the body at the waist area.

Surprisingly, even though it was expected that those with the inverted triangle shape would be less satisfied with the waist the findings rather showed a higher scores of satisfaction for respondents who chose the inverted triangle shape. This contradicts the finding of Simmons et al (2004). It was expected that those who chose the triangle would also be less satisfied with the bust it showed the opposite.

The choice of various ready-to-wear clothing was based on the satisfaction of the individual. Almost all the participants of the focus group discussions responded that they have enjoyed a degree of satisfaction of wearing some type of ready-to-wear clothing. Findings indicated that the majority of participants were satisfied wearing straight dresses, others also preferred dresses with pleats or gathers, a two-piece garment; a blouse with a skirt or trousers (see Table 7.9 in Chapter 7). The various choices showed the degree of satisfaction of body parts of the individual.

For clothing choice findings indicated that respondents wore fitted dresses, fitted and semi fitted shirts or blouses with bright coloured or plain fabrics more frequently and trousers with pleats in front less frequently. The following clothing items; loosely fitted dresses, shirts and blouses, long sleeved shirts and blouses, straight skirts, clothes with dark coloured fabrics wore sometimes however scored the highest percentage. It could be assumed that the greater percentage of the respondents was satisfied with their bust, waist and hip as they are associated with fitted or semi fitted garments.

In relation to age and clothing choice, it was evident that younger respondents wore skirt above the knee, short length dresses and clothes with bright and plain coloured fabric more frequently whereas the older respondents wore loosely fitted

dresses and short sleeved shirt and blouse more frequently. The findings are consistent with the study of Matthews (1979) that the older groups were found less likely to wear skirts above the knee. With regards to occupational groups, findings indicated that the businesswomen wore loosely fitted dresses more frequently, the student/unemployed wore fitted dresses more frequently and the professionals wore skirts above knee, and clothes with plain fabrics more frequently. These differences seen may be attributed to the fact that codes of dressing for the various professions play a role in the choices of clothing.

With regard to marital and childbirth status, the significant difference was that those who were not married and without children wore short length dresses, and skirts above knee length more frequently than and those who were married and have children. It is notably significant from the findings that those who have technical, vocational and commercial qualifications wore loosely fitted dresses more frequently. Respondents with junior/ senior secondary qualifications wore clothes with patterned or textured and plain fabrics less frequently.

In terms of body cathexis and clothing choice, it became evident that respondents who were more satisfied with the waist and abdomen wore fitted dresses and straight skirts more frequently. Those who were more satisfied with the thighs preferred wearing trousers with flat front and fitted dresses and those who were not satisfied with their arms wore sleeveless shirt and blouses less frequently. It became clear that those dissatisfied with the bust preferred wearing loosely fitted shirts and blouses and those who showed higher satisfaction with the buttocks and hips wore trousers with flat front and fitted dresses. Those who were less satisfied with the weight preferred wearing plain fabric clothes than with patterned and textured fabrics and fitted dresses, those who were more satisfied with height indicated they wore long sleeved shirt and blouses more frequently. The finding indicated that respondents who were satisfied with their overall appearance preferred wearing fitted dresses, shirts or blouses with any type of sleeve and fabric. In summary, the findings showed that those who were satisfied with their bust, waist, abdomen, hip and thigh preferred wearing fitted garments.

The findings of the focus group indicated that clothing is used to enhance or camouflage the areas in the body that they are less satisfied and reveal areas they are more satisfied with. These findings correspond with the findings of Kwon and

Parham (1994) and Robinson (2003) who found that women used clothing to enhance body parts they were more satisfied with, but camouflage the areas with which they were less satisfied. Kwon and Parham (1994) demonstrated that women tend to choose certain types of clothing to increase body satisfaction based on how “fat” or “slender” they “feel.” Research has shown that women can use clothing as a means of improving their appearance and consequently their self-esteem (Joyner, 1993; Kwon, 1997).

9.4 Discussion of Anthropometric survey

The third phase of the study focused on the formulation and development of size charts for the Ghanaian women (Aim 3). Body measurement data was obtained through an anthropometric survey conducted in Ghana. The use of anthropometric data for the development of sizing system for clothing is dated back in the 1940’s (O’Brien and Shelton, 1941). The need to use body measurements that relate to the population it is intended for becomes vital when developing a sizing system (Le Pechoux and Ghosh, 2002). The 2D and 3D body scanners are now available and used for recent surveys since they are expected to have higher efficiency, accuracy and faster (Winks, 1984; Mckinnon and Istook, 2002; Simmons and Istook, 2003; Chi and Kennon, 2006). The researcher however used the manual method because scanners were not available in Ghana.

9.4.1 Findings of Body Measurements Analysis

This study used the descriptive statistical information on the mean and standard deviation for calculating the initial values for the development of the size chart. Various studies have used this approach (Beazley, 1998; Otieno, 1999, 2009; Gupta and Gangadhar, 2004; Vronti, 2005; Kuma- Kpobee, 2009). According to Winks (1997) statistical information is used as a convenient indication of obtaining central tendency. Pearson’s Co-efficient Correlation was used in determining the relationships between the body dimensions. Key parameters used for identifying the strength of relationship was based on BS 7231 (BSI, 1990). The bust, waist, hip and thigh body dimensions had good correlations with most of the body dimensions. Weight correlated with all the fifteen girth dimensions and height correlated with nine vertical body dimensions (Refer to Chapter 8, Table 8.3).

9.4.2 Determination and Selection of Key Dimensions from Data

Key dimensions are used in the development of size chart. The Key dimensions should have strong multiple correlations with other dimensions, must be a predictor of size for other body parts and easy to measure as well (McConville et al 1979; Robinette, 1986; Chun-Yoon and Jasper, 1996). Three girth measurements; bust, waist, hip, which have good correlations with other, body dimensions, and height was selected as it was closely related to the vertical dimensions. This corresponds with other studies (O'Brien and Shelton, 1941; Beazley, 1999; BS EN 13402-3, 2004; Gupta and Gangadhar, 2004; Vronti, 2005; Otieno, 2008; Kuma-Kpobee, 2009). According to Winks (1997), a combination of vertical and girth measurements must be used if all the measurements are to be accurately predicted. Although weight correlated well with all the girth dimensions it was not used as a key dimension because it cannot determine the actual shape of a person thereby affecting garment fit. This is consistent with explanation given by other researchers (O'Brien and Shelton, 1941, Green, 1981).

9.4.3 Development of Size Chart from Raw Data

The development of a size chart was carried out by using the mean and standard deviation. The mean was used as the base size (12) for the calculation in the development of every size chart. It is the most widely used value for calculation of the size steps (Beazley, 1998; Otieno, 1999, 2009; Kuma-Kpobee, 2009). The size steps were developed by adding and subtracting the standard deviation value from the mean to obtain different values. Five size steps were obtained as suggested by Beazley, (1997-1998) who specify that the entire sample is statistically catered for by using five standard deviation divisions. The two and half standard deviation (-2.5SD and +2.5SD) values were calculated to create more sizes using the same raw data. In this study the seven steps approach, which was initially used to find out the extent of coverage of the individual dimensions, was not used. This process helps in determining the upper and the lower limit of the size range. Percentage coverage differed from each body dimension. Five sizes (Size 8- Size 16) were created from the data. The codes assigned to each size were GHA8, GHA10, GHA12, GHA14 and GHA16. The size range covered over 91% of the women measured and the majority of the women fall within sizes 10-14 (Refer to Table 8.13 in Chapter 8).

9.4.4 Evaluation of Size Charts Developed for Ghanaian Women

The findings of the study showed that coverage of the size chart was 91% of the population, which was to be acceptable in the production of ready-to-wear clothing (Winks, 1997). The verification of the developed size chart demonstrated that the majority of participants had satisfactory fit with percentage coverage between 88.6% and 100%. The majority of the (85.7%) of the consumers indicated that they were satisfied with the garment fit. Amendments were made to three vertical dimensions; arm length, inside leg length and outside leg length when the fitting trials showed they were long. New values were obtained for sizes 8, 10, 14 and 16 by normalising the data. Comparison could not be made to any official size chart in the study to determine whether there has been any change in the key dimensions of the population studied. The findings of the study showed that the key dimensions (bust, waist and hip) of the average Ghanaian size 12 were smaller or similar to other size charts. This was confirmed by making general comparisons with other studies. Factors chosen for making the comparison included; age, country, and population of each study. Gupta (2004) and Zernike (2004) illustrated that the main factors that contribute to the differences in sizes are age, race, ethnicity and country.

The demographic factors of the various studies (Beazley, 1997; Gupta and Gangadhar, 2004; Vronti, 2005; Kuma-Kpobee, 2009; Size UK; Size USA) were compiled in order to do a good comparison. Out of the seven surveys, only three, Beazley (1998) Gupta and Gangadhar (2004) and that of Kuma-Kpobee (2009) could be compared effectively with the current study. Beazley (1998) and Gupta and Gangadhar's (2004) studies focused on the similar age group and It was evident that the body dimensions obtained for the size chart of this study were closer to that of Beazley and Gupta and Gangadhar's size charts. Although Kuma-Kpobee's (2009) study focused on the same demographic population as the current study, the difference was in age group used in the sample (see Chapter 8, Table 8.11). The two studies obtained different body dimensions. The key dimensions of this study were smaller when compared to Kuma-Kpobee's study. The differences in the body dimensions obtained were attributed to the fact that the studies focused on different age groups of the population (Gupta, 2004). The findings indicated that the younger population had smaller girths which are well defined in comparison to the older population studied by Kuma-Kpobee (2009). The key dimensions of the average size (size 12) of this study are; bust (86cm),

waist (68cm), and hip (96cm) and Kuma-kpobee's bust (92cm), waist (78cm), hip (101cm) study. It can be concluded that even though there were differences in the body dimensions, there was some similarities in the body shape of Ghanaian women. From the two size charts, it was demonstrated that the dimensions of the hip girths was larger as compared with the dimensions of the bust girths. On the other hand, the dimensions of the waist girths were smaller when compared with the bust and hip. However, the average height of the population sample in this study (160cm) was taller when compared to Kuma-Kpobee's sample (158cm) this shows that to the younger population have grown taller than the older population. This study concludes that age was a very strong determining factor in obtaining the body size dimensions for the current study.

9.5 Development of Conceptual Framework

This section describes the development of a conceptual framework to demonstrate the relationships of clothing sizes, body shapes and manufacturing strategies for the Ghanaian market. The conceptual framework is based on the findings of the research from the clothing manufacturers, stakeholders and consumers on issues of sizing systems, body shape and size and manufacturing processes involved in the production of ready-to-wear clothing. This study developed a conceptual framework that offers a better understanding of clothing sizes, body shape and facilitates manufacturing strategies for the Ghanaian clothing industry (Aim 4). The conceptual framework was developed based on the inputs (research work) and the applications (development). The framework developed for this study considers the four main beneficiaries: clothing manufacturers, consumers, stakeholders and researchers. The conceptual framework of this study is illustrated in Figure 9.1

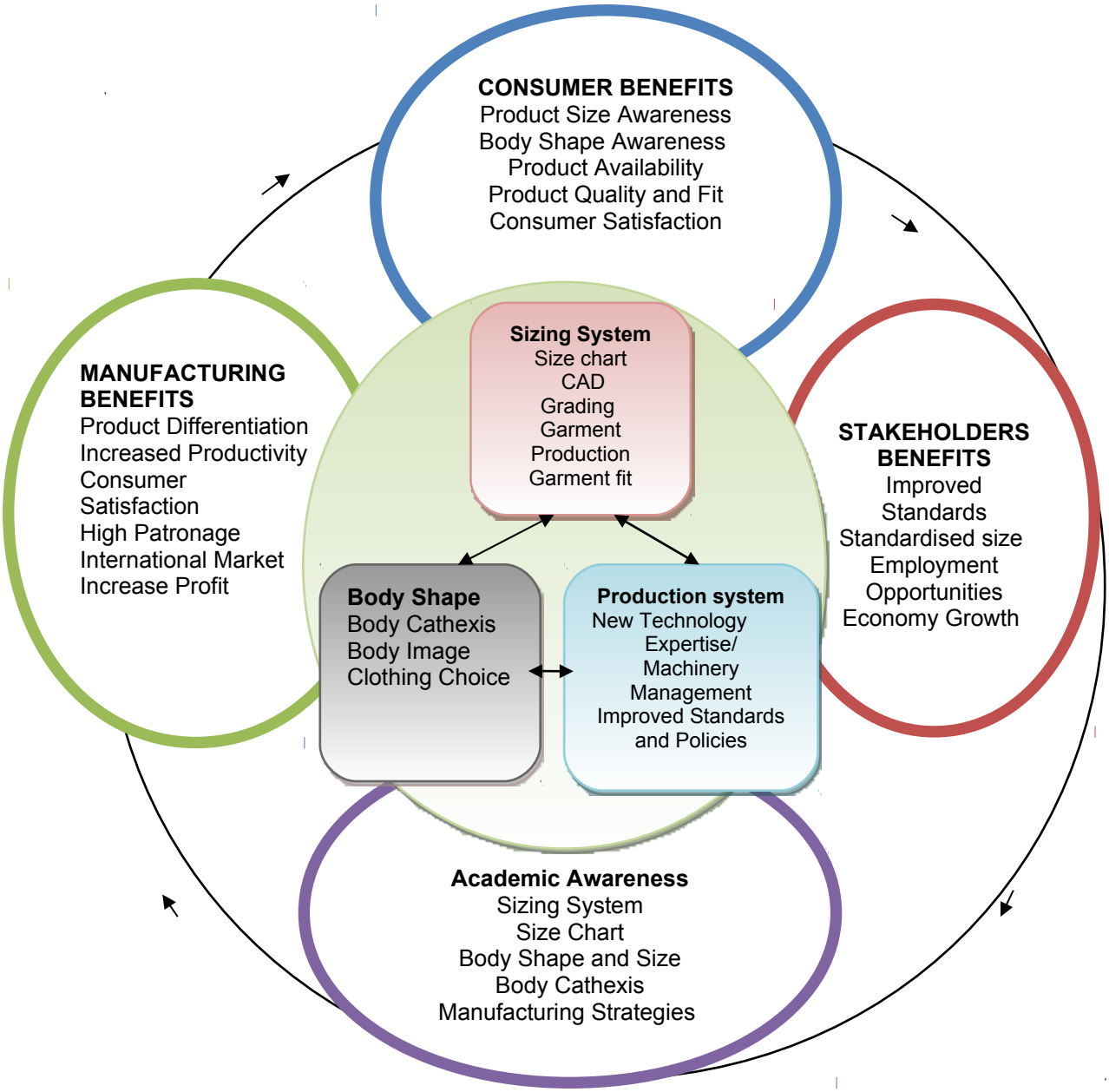

Figure 9.1: The Conceptual Framework for this Study

The framework developed for the current study was considered in three phases. The first phase was the exploratory stages of the research and methodology used for the collection of primary and secondary data. Chapters 2 and 3 present the secondary data, literature reviewed for this study. The purpose of reviewing the literature was to understand the research topic and to provide a theoretical base to assess the formulation of the research aims and the development of the data collection instruments. The primary data was collected through interviews conducted with clothing manufacturers and stakeholders to analyse the current sizing systems used by the manufacturers and other issues related to clothing manufacturing in Ghana. Focus group discussions and questionnaires were used to evaluate consumer perception relating to body shape, size and body cathexis and their effect on clothing choice. The methodology used was detailed in Chapter 4 and the analysis was presented in Chapters 6 and 7. The findings from the current study supported the development of a sizing system for the production of ready-to-wear clothing for the Ghanaian market.

Secondly, the conceptual framework represents the development and application stage of the study as shown in Figure 9.1. This involved the data collection of body measurements obtained using anthropometric survey, which led to the development of a size chart for the production of ready-to-wear clothing. The methodology used for the survey is presented in chapter 5 and the analysis of the data and the developed size chart is presented in Chapter 8. This informed the development of basic blocks patterns using the Pattern Design Software (Gerber) with size 12 as the base size. The blocks for bodice, skirt, trousers and dress were constructed. The patterns were graded into sizes 8, 10, 14, and 16, which formed the development of the size chart from the blocks. Garments were manufactured and analysed for garment fit on the human form. The data on body shape and size will help the manufacturers understand the dynamics of the body and identify the characteristics consumers desire from clothes.

The developmental phase also included the application of a manufacturing strategy, which involves the use of appropriate technology (expertise, machinery and technical know-how) and productions system to facilitate mass production of ready-to-wear clothing. The manufacturing strategy was based on the results of the current study. Literature has shown that today's clothing industry uses

appropriate technology and production system to meet the demand of consumers. The adoption of new technology would improve the operations of the ready-to-wear companies. The application of mass production requires investing in the acquisition of the necessary equipment such as the Computer Aided Design (CAD) systems for grading patterns and computer numeric control guided automated cutting systems that enhance speeding of production (Fianu and Zentey, 2000). This development would therefore demand the use of effective production methods where workstations are highly specialised and which involves the flow of goods through such systems. The interpretation of anthropometric data into size chart would therefore be handled efficiently in order for output to relate well with the body shape. Through the assistance of the government and stakeholders as shown in Figure 9.1, the clothing industry would acquire the necessary materials and equipment as well as creating a better environment for clothing manufacturing companies illustrated in the literature review in Chapter 3 Section 3.2.

Thirdly the conceptual framework represents the benefits and contributions this study offers to clothing manufacturers, consumers, stakeholders and academicians. This study addresses the sizing issues of ready-to-wear clothing and adds to knowledge on the development of size chart, issues on body shape, size and body cathexis and manufacturing strategies. A size chart has a central role in clothing manufacturing as it is linked with the company inputs, strategies and market targets. Size charts contribute greatly to garment quality and fit because customers now demand garments that will enhance their physical appearance. The issue of garment quality and fit is a direct challenge to all clothing manufacturers. The use of different size charts was identified as the major factor that leads to non-uniformity or non-standardised measurements in the production of ready-to-wear clothing. This conceptual framework will provide vital information for clothing manufacturers in the form of developed modified size chart for Ghanaian women thereby eliminating variations in sizes, differences in coding and labelling. It will ensure that well-fitted and quality garments are produced to satisfy consumer clothing needs. Clothing manufacturers, who produce for niche market, will be able to produce for a wider market with the provision of the developed framework, as it will address the issue of clothing sizes, consideration of the body shape as well as manufacturing strategies. The framework is expected

to facilitate and improve on mass production of ready-to-wear clothing in Ghana. Again, Ghanaian clothing manufacturers who are interested in the wider range of sizes to meet the needs of their target group and those who desire to go into export trade to promote African designs may benefit from future work because of the developed framework. Clothing manufacturers would be able to differentiate between products and improve upon the fit to enhance the quality of product. The use of the developed size chart coupled with appropriate machinery and labour will enhance clothing production in Ghana, improve customer satisfaction, boost patronage, increase production and profit margins. The framework is expected to facilitate and improve on mass production of ready-to-wear clothing in Ghana.

The framework will create size awareness thereby enabling standardised identification of clothing (sizing, coding and labelling) by consumers. Consumers' benefits include improved quality and fit of garments to satisfy their needs. It will help consumers to understand the dynamics of the body shape and therefore help them evaluate body shapes and their effect on clothing choice. The use of the developed size chart by manufacturers will help consumers choose the right sizes using garment codes and labels. The availability of ready-to-wear clothing will solve the need of customers' increasing demand since manufacturers will not be producing only for niche market but for the wider market. The improved ready-to-wear clothing in terms of finishing, packaging, design, fabric and stitches will help consumers change their perception that locally produced clothing are inferior to the imported ones thereby boosting patronage. The improvement of quality of clothing will be as a result of the manufacturers using the developed modified size chart, modern machinery and materials, the right work force with the right skills and a good manufacturing strategy in place.

The stakeholders will benefit from the framework as it will serve as the basis for conducting a national anthropometric survey for all age and gender groups. Improved garment size and fit will enhance the standard of clothing produced in Ghana. The regulation of the influx of clothing items, the use of new technology and material, availability of capital, expertise and skilful personnel as addressed in the framework would boost the growth of the local industry thereby leading to employment opportunities and growth of the economy. Finally, the documentation of the procedures and methods used in the development of this size chart, will

extend knowledge for research purposes. The data obtained from the focus group and questionnaires on body shape, size and body cathexis (as shown Figure 9.1) will serve as the foundation for further studies since no such study has been conducted on Ghanaian women for this age group. The documentation made on manufacturing strategy will also contribute to knowledge for manufacturing sector in Ghana and elsewhere.

9.6 Chapter Summary

This chapter discussed the key findings presented in this study. The first section discussed the interviews conducted with the clothing manufacturers and stakeholders and the focus group discussion conducted with clothing consumers, to achieve the first aim of the study, which sought to analyse the current sizing systems used for the production of ready-to-wear clothing in the industry in Ghana. The different sources of sizing systems, variation of sizes, coding and labelling of garment sizes were examined. Pertinent issues such as the development of national sizing system, clothing standards and government policies relating to the clothing industry in Ghana were established. It became clear that there was no official sizing system developed based on Ghanaian women. The absence of the national size chart has allowed the clothing manufacturers to adopt size charts from countries such as UK, USA and the International standards (ISO). The use of size charts from different sources has resulted in variations in sizes, confusion about size codes and labels. It was evident that a size chart based on the population is needed urgently to bring about uniformity, minimise variations in sizes and confusion in size codes. Ready-to-wear clothing industry needs to grow in terms of manufacturing. The study found that the role of the government had become paramount to the sustainability of the clothing industry. Further to it favourable Ghanaian government policies, support in the form of bank loans, importation of raw materials and also regulation of the inflows of foreign goods need to be developed to ensure the expansion on the Ghanaian clothing industry.

This chapter also discussed the findings of the questionnaires and focus group discussion for consumers. The second aim of the study focused on evaluation of consumer perception relating to body shape and size, body cathexis and their effect on clothing choice. This study showed significant relationship between body shape, body cathexis and the clothing choice. Although responses showed some

level of dissatisfaction of some parts of the body there were higher percentage scores for satisfaction of all the 15 body areas than other similar studies conducted for American and European women. The Ghanaian women were most satisfied with hip, buttock, thigh and bust but dissatisfied with their arm, shoulder and waist. This finding was in contrast with many studies, which focused on western women.

The findings of the anthropometric survey of this study were discussed. Comparisons made between the current study and other studies revealed similarities and differences in the key body dimensions. This study compared favourably with other studies that used the same age group but with different population for their research. This study established that there were no official size charts to compare the developed size charts with this anthropometric research-based size chart. This research will serve as a basis for further studies and a fundamental component of the manufacturing strategy for the Ghanaian clothing industry. The final section of this chapter illustrated the development of the conceptual framework. The framework will promote understanding of theory with practice of clothing production by demonstrating the relationship between the various aspects of the study.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

10.1 INTRODUCTION

The principal aim of this study was to develop a conceptual framework to facilitate the understanding of clothing sizes, body shape and manufacturing strategies for

the production of ready-to-wear clothing in the Ghanaian. This study was undertaken to contribute to knowledge and practical, academic and research purposes. The focus of this chapter is to draw conclusions and offer recommendations for further studies.

10.2 Conclusions

This study was to develop a conceptual framework that will benefit clothing manufacturers, consumers and researchers. The formulation of body dimensions size chart for Ghanaian women from data obtained has been dealt with extensively in Chapter 8. This study contributes to knowledge by providing detailed procedures involved in developing a research based anthropometric data and size chart. From the interviews conducted for clothing manufacturers and consumers, it became evident that there was variation in sizes, coding and labelling of ready-to-wear clothing produced by Ghanaian clothing manufacturers. The main causes of the variation in sizes was attributed to the use of sizing systems from different countries, varying allowances used for the garments and difficulty of interpretations of size charts. The resultant garments were of different sizes despite similarity in code*s.* The garments produced using these size charts resulted in dissatisfaction amongst Ghanaian women. It became clear that the absence of a Ghanaian size chart has resulted in manufacturers to adopt and modify size charts from elsewhere.

During the thorough search for literature, it became evident that documentation on the procedures involved in the development of size chart was scarce, although a few researchers have made contributions in this area of study (Roebuck, 1995; Pheasant, 1996; Beazley, 1997, 1998, 1999, Otieno, 2009). This may be as a result of proprietorship of companies not willing to give information on sizing for fear of making known trade secrets, which has led to assessment that are non-analytic and unreliable. The current study has therefore contributed to knowledge by providing an insight into the procedures used in the development of size charts. Detailed explanation was provided for each aspect of the processes involved in this study. They included determination and selection of key dimensions, size codes, development of garment measurements (CAD and grading) and procedures involved in fitting trials. The new size chart developed from this study had five sizes, coded, using numerical method (GHA 8, GHA10, GHA12, GHA 14

and GHA 16). The key dimensions chosen for this size chart were; bust, waist and hip as well as height. The selection of the key dimensions as the basis for size chart formulation is very vital in the determination of sizes of individual as it emphasises the relationship between the body parts.

Findings from the clothing manufacturers, stakeholders and consumers highlighted the need for a sizing system that relate to the Ghanaian women and satisfy their different body shapes. The current study will serve as a baseline for other future research in Ghana because there no is official national size charts. The absence of size chart made it impossible for comparisons to be made to determine whether there have been changes in the body shape and size of Ghanaian women over the years. However, from the findings in Chapter 9 the key dimensions (bust, waist, hip and height) of the body measurements were compared with some size charts from other populations (Size UK, Size USA, Beazley, 1997, Gupta and Gandaghar, 2004). It compared favourably with the studies that used similar age groups. The body shapes of the current and the previous studies were however similar. This was seen from the dimensions obtained for the key dimensions from the current study and Kuma-Kpobee's (2009) study. The current study concludes that age was a very strong determining factor on obtaining the size dimensions. The size chart can be applied authentically to the intended target group of the population. This study therefore proposes the adoption of the current size chart for use of the production of ready-to-wear clothing for Ghanaian women age 16-35 years. The study present size charts for Ghanaian women years using numerical coding system with key dimensions as bust, waist and hip girths and height. This study concludes that the selection of key dimensions as the basis for formulation of the size chart is very important in the determination of sizes of the individual as it emphasises the relationship between the body parts. The study concludes that the bust should be a predictor of sizes for the upper part of the body and the hip girth for the lower part of the body.

It became evident that body shape has a direct influence on the choice of clothing as its acceptance may depend on its suitability and appropriateness to a specific body shape. The study illustrated that what is perceived as a well fitted garment may provide different results for women with the same size but with different body shapes. Changes in the body shape of women affect their size and therefore

information of the sizes should be updated constantly in order to meet the size demand of consumers. Findings from the current study also offer insight into how women choose clothing based on which parts of their bodies they experience greater satisfaction, and provides information about the types and styles of clothing that women choose because of how they feel about their bodies. Ghanaian women are satisfied with their bust, buttock and thigh but dissatisfied with their waist, arm, shoulder and calf unlike western women. It became evident that women who chose the inverted triangle shape were rather satisfied with their waist and those who chose triangle were not satisfied with their bust, which contradicts the findings of other studies. This study recorded higher scores of satisfaction for all body areas, and this demonstrated a higher sense of appreciation of the body by Ghanaian women.

This current study found significant relationships existed between body cathexis and clothing choice. The choice of clothing was based on the level of satisfaction with body parts. The findings from this study confirmed that women who were more satisfied with certain key parts of their bodies (waist, abdomen, hip and thigh) preferred wearing clothing that give a better garment fit to those areas. Factors such as hereditary, lifestyle and diet, childbirth among others were identified as contributing to the changes in the bodies of Ghanaian women. It was evident that societal influence is a strong determining factor. Clothing manufacturers and product developers need a better understanding of body measurements in relation to body shape and impact of components of body shape and body cathexis on personal fit preference to exactly fit target consumers and improved products. This current study contributes immensely to knowledge on body shape, body size and cathexis and clothing choice. It may be used as a basis for other studies since majority of research in this area has been based on the Western women.

The current study established that the set-up of clothing manufacturing industry in Ghana was non-industrialised as a result they find it difficult to meet the demands of the market. In today's world the manufacturing companies combines technology, workforce and strategy to succeed. Hayes and Wheelwright, (1979) state that the traditional factories have replaced human labour with machines, while production has been simplified through standardisation and repetition

thereby speeding production and reducing unit cost. The machinery (technology and equipment) used in the clothing manufacturing companies in Ghana were not state-of-the-art equipment. This has hindered the majority of companies from producing on a large-scale and meeting the quality demanded by consumers and delivery times.

This study found that the greater percentage of ready-to-wear companies operate at a small-scale and medium-scale levels and most of them do not have the financial capabilities to acquire machinery that can help in mass production. In the light of this incapability of the individual companies in terms of handling mass production, the study proposes the formation of clusters and partnership by clothing manufacturers in order to pull resources together, seek assistance from the government in the form of tax relief and machinery, and financial assistance in the form of loans from the banks. These clusters and partnerships can subcontract contracts to other clothing manufacturers whose financial capabilities may not allow them to win contracts. Workshops could be organised to up-grade the technical, marketing and managerial skill of members and mass production strategies. The need for capital to invest in modern machinery and expertise to enable them meets the demand and a standard of today's world is paramount to the clothing industry. The use of new technology by purchasing the modern machines that can enable individual companies to improve on the quality and fit as well as increase production need urgent attention.

The study recommends that the industry need a complete shift from using domestic equipment and production methods that are non-industrial to the adoption of advanced technologies in order to help the industry produce quality items in mass quantities. The industry need both skilled and semi-skilled labour as most of the companies rely mostly on semi-skilled and apprentices which is likely to compromise the quality of the garment produced and not be able to interpret the size chart. Education and training of individuals for the clothing industry therefore needs attention. Although fashion and vocational colleges are been run by Ghana Education Service as part of the National Educational curricula in all levels of education (secondary, vocational, polytechnic and university) the full impact of skills of the graduate are not much felt by the industry. The current study illustrated that this problem is the result of the gap between the industry and education.

Cooperation between the two institutions needs to be strengthened to enable students to have industrial training as part of their formal training. The demand of the industry should also be factored into the curricula for the training of students. The stakeholders can also assist the institutions by ensuring that the needed materials and facilities for the training of students are in place.

The study revealed that the acceptance of the locally made goods would boost patronage thereby helping the industry to grow. All the groups were of the view that there should be a change of attitude, perception, and judgment of Ghanaian consumers towards made-in-Ghana products. The majority of Ghanaians do not want to purchase made-in-Ghana products irrespective of the quality when compared with other imported clothing as demonstrated in the study. This is because of the negative opinion they have formed about the locally produced garments. The importation of second hand goods and the influx of ready-to-wear clothing have affected the local manufacturing industry. The involvement of the government in the clothing industry can help sustain the companies. This could include support and provision of tax relief on the importation of raw materials and equipment and implementation of policies that will help protect the local industry. It can be deduced from the study that most of the companies find it difficult to sell their products through the wholesale and retail marketing channels. This situation result in high cost of garments because of the use of middlemen who add unreasonable profit margins. This is so because the ready-to-wear clothing market in Ghana is not as established as the developed countries. This situation demands that the Ministry of Trade and Industry should put structures in place to help manufacturers have the right channels to sell their products and a pricing system that will help stabilise the fluctuation in prices of clothing items. The academic and other government training institutions can provide training for the clothing companies in order to help them improve upon the quality of their products.

The production of ready-to-wear clothing requires the use of size charts in order to have standardised sizes to facilitate production. The standardisation will help manufacturers produce in large quantities, which would be available, and in reduced prices to meet the need of the consumers. The current form of production; free hand and manual cutting do not promote standardisation of garments and therefore undermines the concept of mass production and subsequently

industrialisation. The survival of manufacturing companies in the competitive environment may depend on the way their products conform to design standards, meet the requirements of customers in terms of short delivery times and most importantly low production cost. The adoption of the size chart and the conceptual framework of this study will therefore provide direct focus for the clothing manufacturers. The companies will have distinct advantage in the market place and provide coordinated manufacturing support. The growth of the clothing industry thereby demands a collective effort between the clothing manufacturers, stakeholders and consumers.

The basis of the conceptual framework of this study may be fundamental in the development of theories on clothing sizing and body shape and their role in the clothing manufacturing companies. It is expected that the conceptual framework presented in Chapter 9 Figure 9.1 would provide considerable information for the formulation and development of other theories on sizing system, body shape and manufacturing strategies.

10.3 Recommendations for Further Studies

The study focused on women aged 16-35 years since an extensive sample would have been beyond the scope of this study, time and financial implications.

1. This study recommends that further anthropometric studies should be conducted to cover all age categories of women in Ghana. Since there are no sizing systems for men and children, the study proposes that studies should also extend to the male population as well as the children of all age groups as they will serve as database for sizing in the Ghanaian clothing industry. The development of a sizing system will promote the clothing industry and improve the clothing fit for consumers. Future studies would be able to make comparisons and provide important information about the characteristics of the changing shape and sizes of Ghanaian women, as it is very vital for revision of size chart periodically.

2. This study recommends that more samples should be examined and compared to establish the differences between body shapes of the younger and older populations. This would enable researchers to investigate more closely the body shapes and body cathexis of consumers in different age groups.

3. It is recommended that further research methodology such as the body scanning technology and the developed software for Female Figure identification Technique (FFIT) for Apparel could be used in conjunction with questionnaire in order to verify body shape, strengthen the relationship between body shape, and clothing choice.

4. The study revealed that clothing manufacturers were producing clothing without conforming to any clothing standard instituted by the Ghana Standards Board. This has resulted in substandard products ending up in the market. The study therefore recommends that the Standard Board should make clothing standards accessible to all clothing manufacturers and ensure that all clothing items produced are based on these standards.

5. Finally this study recommend that the framework should be expanded and helped in improving the production of clothing in the Ghanaian clothing industry as well as in other African countries.

10.4 Limitations

Various researchers have stated that anthropometric surveys are time consuming and expensive (Tamburino, 1992). The current survey needed time and financial planning as it involved travelling between two regions and numerous centres that were designated for the anthropometric survey, training of assistants and acquisition of materials, conducting interviews, focus group discussions and administering questionnaire. Another major issue that demanded time was the actual measurement taking as the manual method was used. The cultural and religious beliefs of Ghanaian posed a challenge to the researcher because the manual method involved the use of tape measure and having physical contact with the subjects. The country upholds high religious and moral, cultural beliefs as about 99.9% of the population are affiliated to some religion, or belong to cultural lineage with values and practices. Some of the women who envisaged it as against their religion expressed their dissatisfaction in wearing only undergarments for the survey, they declined to be measured even where they had participated in the initial preparation. The availability and attitude of subjects were also constraints to the researcher. Most of the subjects were drawn from colleges and

polytechnics and universities was in session some turned up late for their scheduled times. This affected the period for the survey. Extra time was spent to explain the survey to subjects to assure them of the safety, privacy and confidentiality or their involvement. Other constraints cannot be explained as they were termed personal by the subjects.

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APPENDICES

Appendix A: Letter from Dept. of Clothing Design and Technology-MMU

APPENDIX B: Letters to Institutions

Dept. of Clothing Design and Technology
Manchester Metropolitan University
Hollings Faculty
Old Hall Lane
Manchester
M14 6HR
6th May 2008

The Rector
Accra Polytechnic
Accra- Ghana

Dear Sir,

PERMISSION TO USE FACILITIES AND STUDENTS FOR MEASUREMENT TAKING

As part of the PhD programme I am pursuing at Manchester Metropolitan University, I will be taking 32 anthropometric body measurements each from 800 women in Accra and Kumasi Polytechnics and other vocational institutions to develop a size chart for the Ghanaian women. I would be grateful you will permit me to use the facilities and student in the Department Fashion Design.

I will be taking this survey between September and December this year. The institution will benefit from the outcome of my studies since it will provide a size charts for the Ghanaian women, and serve as a basis for the study of anthropometrics in Ghana.

I am therefore counting on your usual cooperation.

Thank you.

Yours Faithfully,

Stella Adu-Boakye (Mrs.)
Telephone: 0044-(0) 161-231-8838/07538326616
Email:STELLA.ADUBOAKYE@student.mmu.ac.uk

APPENDIX C: Letters to Clothing Manufacturers and Stakeholders

Dept. of Clothing Design and Technology
Manchester Metropolitan University
Hollings Faculty
Old Hall Lane
Manchester,
M14 6HR
6th May 2008

The General Manager

Dear Madam/Sir,

I am postgraduate student in the Department of Clothing Design and Technology in the Manchester Metropolitan University. I am currently studying for a PhD. My area of research is clothing anthropometrics, which deals with the measurement of various parts of the body for developing a size chart for clothing manufacturing.

The research aims to identify current sizing systems used by manufacturers and to develop size charts. As part of my research, I need to conduct interviews with clothing manufacturers and stakeholders. The discussion will be centred on issues pertaining to size charts and garment fit.

I would be grateful if you would grant me permission to interview you, or alternatively be directed to someone in your company who deals with these issues. Your valuable input will be most appreciated and all information will be treated confidentially.

Yours Faithfully,

Stella Adu-Boakye
Telephone: 0044-(0) 161-231-8838/07538326616
Email:STELLA.ADUBOAKYE@student.mmu.ac.uk

APPENDIX D: Chart on Stakeholders

Name of Stakeholders, Contact Address/Telephone &Fax numbers	Organisational Profile
President's Special Initiative on Garment & Textiles (under the Ministry of Trade & Industry) P.O. Box 46, Accra 233 21 676928/ 238251 Mobile: 024 374226 Fax 233 21 662086 psighana@africaonline.com.gh	'Presidential Special Initiative' (PSI) was to ginger public-private sector partnership and create some 100,000 jobs within the next four years. The initiative, which is two-fold, will lead to a realisation of the president's vision to create a 'Golden Age of Business'. The initiative is Ghana 's response to the United States ' African Growth and Opportunity Act (AGOA), and would ensure that Ghana takes full advantage of the Act. Besides, the garments and textiles sector would create 70,000 jobs. The PSI second production platform, would involve building capacity of about 100 Ghanaian enterprises to establish and operate medium-scale manufacturing plants for garments. Ghanaian entrepreneurs would become merchant garment exporters and work with about 50 small-scale tailors and seamstresses in due course.
Ghana Standards Board (STB) P.O. Box MB 245, Accra, Ghana Off Tetteh Quashie Interchange, -Legon-Madina Road near Gulf House, Okponglo 233) 21 -500231, 500065/6, 506992, 500092,500231 gsbdir@ghanastandards.org gsbnep@ghanastandards.org www.ghanastandards.org	The National Quality Infrastructure is supported by the Ghana Standards Board (GSB), which is the national standards body on behalf of the Ministry of Trade and Industry (MOTI). The board is responsible for National Standards development and dissemination; Testing Services; Inspection Services; product Certification scheme; Calibration, Verification and Inspection of weights, measures and weighing and measuring instruments; Pattern approval of new weighing and measuring instruments; Destination inspection of imported High-risk goods; Promoting Quality Management Systems in Industry; Advising the Ministry of Trade and Industry on standards and related issues. Testing and Quality Assurance constitute GSB's commercial operations while Standards and Metrology form its core activities. In its efforts to promote a sound Quality infrastructure, GSB also collaborates with relevant government institutions in Ghana and other international and national Standards-setting bodies.
Ministry of Trade and Industry P.O Box M47 Accra (+233-21) 686563 (+233-21) 662428 mis-moti@africaonline.com.gh	The Ministry of Trade and Industry has overall responsibility for the formulation policies, implementation and monitoring of Ghana's internal and external trade. The sector ministry ensures that Ghana derives maximum benefit from internal trade relations and that domestic trade is conducted in a smooth and orderly manner.
GOG/UNIDO Textile/Garment Training Centre P.O Box MB.177 Accra, Ghana Accra Technical Training Centre, Kokomlele, Accra 233-21-246650 adjeibia@yahoo.co.uk	This is a training centre or laboratory established by the government in collaboration with UNIDO to be used to up-grade skills of textile and garment industries that take advantage of AGOA and exports in other destinations. The industry is also currently supported by 21 National Vocational Training Institutes, which provide basic practical and theoretical training in tailoring and dressmaking.
National Board for Small Scale Industries (NBSSI) P.O. Box MB 85, (Adjacent FAO) Accra. Tel: 233-21-668641/2 Fax: 233-21-669707/661394 E-mail: nbssided@ghana.com	The National Board for Small Scale Industries (NBSSI) is the apex governmental institution for the promotion and development of the Micro and Small Enterprises (MSE) sector in Ghana. NBSSI's mission is to improve the competitiveness of micro and small enterprises by facilitating the provision of business development programmes and integrated support services. Its vision is to create a more vibrant entrepreneurial society by fostering the growth of micro and small enterprises. The major goal of NBSSI is to effectively promote the overall development of micro and small enterprises to ensure efficiency and competitiveness in the production and distribution of goods and services and thereby contribute significantly to the development of the economy.

Association of Industries (AGI), 2nd Floor, Addison House Trade Fair Centre, La - Accra P. O. Box AN - 8624 Accra North - Ghana Tel: 233 - 21 - 779023 / 24 Fax: 233 - 21 - 7773143 / 763383 Email: agi@agighana.org URL: www.agighana.org	The Association of Ghana Industries (AGI) is a not-for-profit organisation, registered in Ghana. AGI has more than 1000 members from all over Ghana and is considered to be the leading voice of the private sector. AGI's main objectives are to contribute substantially to the growth and development of industries in Ghana and to create a business climate, which will allow Ghanaian companies to be internationally competitive**.** AGI advocates for policies that will enhance the effectiveness of markets, strengthen the competitiveness of local industries, generate opportunities for private business create employment
GRATIS Foundation (Ghana Regional Appropriate Technology Industrial Service) P. O. Box CO 151, Tema-Ghana. Tel: (233) 022 204243/207610 Fax: (233) 022 204374 executivedirector@gratisghana.com gratis@ighmail.com	GRATIS Foundation evolved out of the Ghana Regional Appropriate Technology Industrial Service (GRATIS) Project was mandated to promote small-scale industrialisation in Ghana. To accomplish this mandate, GRATIS established Intermediate Technology Transfer Units (ITTUs) now designated Regional Technology Transfer Centres (RTTCs) in nine regions of Ghana to transfer appropriate technologies to small-scale industrialists through training, manufacturing and the supply of machine tools, plants and equipment.
Private Sector Development Post: D.T.D. 204 Cantonments, Accra, Ghana Tel: (+233)-(21)-521238 - 42; (+233)-(21)-506208 Fax: (+233)-(21)-506205/7 Email: info@gipcghana.com www.gipcghana.com	Private sector Development was set forth to build a world standard business environment in Ghana as a national vision. It then envisages that the government's role is to execute broad-based reforms under the market principle for the purpose of developing the private sector.
Ghana Investment Promotion Centre (GIPC) Post: D.T.D. 204 Cantonments, Accra, Ghana Tel: (+233)-(21)-521238 - 42; (+233)-(21)-506208 Fax: (+233)-(21)-506205/7 Email: info@gipcghana.com www.gipcghana.com	The Ghana Investment Promotion Centre (GIPC) is a government agency, re-established under the Ghana Investment Promotion Centre Act, 1994 (Act 478). The aim of the agency is to encourage, promote and facilitate investment in all sectors of the economy except mining and petroleum. The functions Of GIPC include initiating and supporting measures that will, enhance the investment climate in the country for both Ghanaian and non-Ghanaian companies, promoting investments in and outside Ghana through effective promotion, collecting, collating, analysing and disseminating information about investment opportunities and sources of investment capital, and advising on the availability, choice or suitability of partners in joint-venture projects, registering and keeping records of all enterprises to which this Act is applicable, identifying specific projects and inviting interested investors for participation in those projects initiating, organizing and participating in promotional activities such as exhibitions, conferences and seminars for the stimulation of investments.
MSME (Micro small and Medium Enterprises) P.O Box M47 Accra (+233-21) 686563 (+233-21) 662428 mis-moti@africaonline.com.gh	MSME is a government funded programme to provide essential financing and technical support to enhance MSME development. The secretariat has access to finance, market, trade facilitation and entrepreneurship development, business environment and implementation, monitoring and evaluation.

Appendix E: Interview Questions for Clothing Manufacturers

A semi- structured questionnaire will be used for interviewing managers of the clothing manufacturing companies in Ghana. This will allow the participants to express their views without any restriction and to tap rich information from them.

Aim: To evaluate the current sizing systems used for ready-to-wear clothing in Ghana

Introduction

The purpose of this interview is to identify the sizing systems used in the production of ready-to-wear clothing and other issues relating to the production in the clothing industry. Issues pertaining to the production of clothing will inform the discussion since it will give a better understanding into concepts such as garment fit, sizing, consumer satisfaction and manufacturing practices. Please you are at liberty to express your views about these issues mentioned above. The information will be treated as confidential and will only be used to facilitate this study.

1. Personal Details

1.1. What is your job title in the company?
1.2. How long have you worked for the company?
1.3. What role do you play in this company?
1.4. Have you obtained any form of training in relation to your job?

2. Company Profile (Administration)

2.1. Could you talk about your company and how it has developed over the years? (Collect company's brochure)
2.2. Would you please outline your company's organisational structure?
2.3. What is the size of your company in terms of employees?
2.4. Have they gone through a form of training?
2.4 What kind of clothing does your company specialises in?
2.5. Which age group is your target market?
2.6. Briefly talk about the company's objectives and philosophy (vision and mission statement?

2.7. Is it known to all employees and if yes how are they working towards achieving them.

2.8. How do you source for work (attract customers)

2.9 How do you distribute/market your products (Do you have any retail outlet, boutique etc)

2.10. Are you a member of any clothing Association? What contribution(s) do they make towards your company?

2.11 Do you have manufacturing system information in place? (New technology and methods of doing things, training, etc)

2.12. How do you ensure that your employees meet your company's standard? (Training and communication)

2.13. Do you read reports from the business environment, financial report, marketing and manufacturing studies?

2.14.Does your company take keen interest in the fashion world, watching CNN and other media channels (catalogues and news reports), attending or taking part in fashion openings, shows and exhibition (Home or Abroad)

2.15. What factor(s) do you consider when producing clothing?
(Price, garment fit and size, design & colour, workmanship)

2.16. Do your company face any competition from other companies?

3. Key issues regarding garment sizing (Technical Person) a copy of the size chart

3.1. Do you make your own garment patterns and who is responsible for making these patterns?

b. How long have you (he/she) been making and cutting patterns?

c. Could you please tell me how these patterns are made?

d. Have you obtained any form of training (either formal or informal -in service-training and coaching, experience, outside training?)

3.2. What type of garments does your company specialises in and in how many proportions?

3.3. What are your size ranges and how are they labelled?

3.4. Could you tell me how the measurements you use have developed over the years?

3.5. Are your measurements based on body or clothing measurements?

3.6. Are these measurements standardized?

3.7. Do you have any measures in place to check the accuracy of the finished clothing?

3.8. If they are not the same in measurement what happens to the garment and who bears the responsibility? (especially in situation where you are producing in quantities).

3.9. Have you ever change this size chart (measurements)

b. When and why did you change these size charts

3.10. Do you ever change size/ measurements for a particular customer? And why

3.11. What is your perception about a good garment fit?

4. Issues regarding Key Measurements

4.1. Which body measurements do you consider vital in the production of women's clothing (Relate it to blouses, dresses, skirts and trousers)

4.2. What are the most common complains you receive from customers who purchase your products?

4.3. How frequent do customers return items made or bought due to fit problems

4.4. When it happens this way what do you do with these garments?

4.5. How satisfied are your customers with your products?

4.6. Do you think there is the need for each country to have its own standard size chart? (Explain why)

4.7. Finally what is your impression about the clothing manufacturing companies now and what are the future prospects of this industry

Thank you very much for providing this information for the study.

Appendix F: Interview Questions for Stakeholders

(Ghana Standards Board, Association of Clothing Manufacturers, PSI-Presidential Special Initiative on Textiles and Garments, Textile/Garment Training Centre)

A semi- structured questionnaire will be used for interviewing four organisations directed linked to the clothing industry in Ghana. This will allow the participants to express their views without any restriction and to tap rich information from them.

Introduction

The purpose of this interview is to find out about the relationship between the organizations and the clothing industry. Standards and policies issues will be discussed. Please you have the liberty to express your views about these issues mentioned above. The information will be treated confidential and will only be used for academic purposes of this study.

Personal Details

1.1 What is your job title?

1.2 How long have you worked for the organisation?

1.3 What is your job description?

2. Organisational Profile:

2.1 Could you talk about your organisation (collect company's brochure)

2.2 Could you state the number of years your organisation has been in operation?

2.3 Which department in your organisation is responsible for the affairs of the clothing sector?

2.4 Would you like to outline the responsibility(s) of your department?

2.5 What is the size of your department in terms of employees?

2.6 What kind of services does your organisation offer?

2.7 What role does your organisation plays in the clothing industry?

Key issues regarding standards (Ghana Standards Board)

3.1 Has there been any anthropometric body measurements survey conducted for the purpose of clothing production in the country?

3.2 Has the country developed its own sizing system?

3.3 Is there any Clothing standards in Ghana?

3.4 Have you adopted any clothing standards from any country or organisation?

3.5 Do you know the sources of size charts used in the production of women's garments in the clothing industry?

3.6 How do you monitor the clothing industry with respect to clothing standards?

3.7 How do you ensure that the individual clothing manufacturer meets those standards?

3.6 Do you think that a national body anthropometric survey should take place in the country and why?

Key issues regarding Policies (Ministry of Trade and industry, Association of Clothing Manufacturers)

4.1 Could you tell me if your organisation has formulated any policies concerning the clothing industry?

4.2. Have they been implemented?

4.3. How do you enforce these policies?

4.4. Do you have any criteria for assessing the individual company's performance in relation to policies?

4.5. Do have any collaboration with the other stakeholders in the clothing sector

4.6. Are you aware of any standards for the clothing industry?

Conclusion

5.1 Could you please describe the state of the clothing industry in Ghana?

5.2 What is the relationship between your organisation and the clothing industry?

5.3 What do you envisage about the future prospects of the clothing industry?

5.4 Is there anything else that might help with this survey regarding the standards and policies formulated for the clothing industry?

Thank you very much for availing yourself for this exercise. It is hoped that information provided will be used to address some of the issues pertaining to the clothing industry

Appendix G: Consent Form for Research Study

I confirm that I have read and understand the information sheet dated for the above study. I have had the opportunity to ask questions and I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.

I agree to take part in the above study. I agree to the interview / focus group / being audio record.

_____	_____	_____
Name	Date	Signature

Appendix H- Pre-Selection Questions

QUESTIONNAIRE FOR PRESELECTION OF PARTICIPANTS FOR FOCUS GROUP DISCUSSION

Instruction: Please tick (√) the appropriate boxes that applied to you and supply answers were necessary

1. Age group
   - 18-22 years ( )
   - 23-27 years ( )
   - 28-31 years ( )
   - 32-35 years ( )

2. Polytechnic Kumasi ( ) Accra ( )

3. Faculty & Department----------

4. Hometown & Region ----------

5. Programme
   - NON- HND ( )
   - Higher National Diploma ( )
   - Bachelor of Technology ( )
   - Other ( )

6. Level of study
   - Year One ( )
   - Year Two ( )
   - Year Three ( )

7. Do you wear ready-to-wear clothes bought from a shop or boutique?
   - Yes ( )
   - No ( )

8 Do you buy ready-to-wear clothes?
   - Yes ( )
   - No ( )

9. How often do you buy ready-to-wear clothes?
   - Once a week ( )
   - Once a month ( )
   - One every six months ( )
   - 6-12 months ( )
   - Never ( )

10. Which types of ready-to-wear clothes do you normally wear?
   - Formal wear ( )
   - Evening wear ( )
   - Casual wear ( )

Specify if other(s)----------

11. Do you know your clothes size?

Yes	( )
No	( )

12. What size is your upper part of the body?

6 - 8	( )
10-12	( )
14-16	( )
18-20	( )
20-22	( )
Other	( )
Do not know	( )

13. What size is your lower part of the body?

Size 6-8	( )
Size 10-12	( )
Size 14-16	( )
Size 18-20	( )
Size 20-22	( )
Other	( )
Do not know	( )

14. Which of these height categories would say you belong to?

Up to 5'5	( )
Up to 5'7	( )
Up to 6'1	( )
Other	( )
Do not know	( )

15. Which of these weight categories do you belong to?

Below 45kg	( )
40-50 kg	( )
51-60 kg	( )
61-70 kg	( )
71-80 kg	( )
81-90 kg	( )
Other	( )
Do not know	( )

Appendix I: Question Route for Focus Group Discussion

Focus Group Discussions with Female Students ages between 18-35 years from Accra /Kumasi Polytechnics

Four groups from the Accra and Kumasi polytechnics will be formed and each group will consist of six participants. Participants will be asked to provide information on body cathexis, body shape and clothing choice. This will therefore answer the aim 2 of the research aims.

The following conventions were laid out in accordance with Bryman (2007) before each session began.

- One person should speak at a time to ensure clarity and for ease of transcription.
- All data will be treated confidentially and anonymous.
- The session will be open and everyone's views are important.
- The amount of the time that will be taken up.
- Introduction by each participant.
- Mobile phone to be switched off to avoid interruption.
- Participants should be made to write their special numbers and place them in front of them for easy identification.
- The session will be tape recorded to allow easy transcription of the discussions.

Aim 2 -To evaluate consumer perception relating to body shape and size, body cathexis and their effect on clothing choice

Introduction

The purpose of the discussion is to find out about how you perceive your body shape. This is to say how satisfied or dissatisfied one may feel towards some parts of the body, which may affect garment fit. Please you have the liberty to express your views about these issues. The information will be treated confidential and will only be used for academic purposes of this study.

Question Route

Introductory Question:

Tell us your name and your programme and why you chose that programme.

1. a. What do you know about ready-to-wear clothing (s)?
   b. How did you identify your ready-to-wear clothing size?
   c. Are you aware of the different size labels for garments? Follow up question
   d. How are you able to choose your correct size from these different size labels by various manufacturers?
   e. Do you see the information on the labels in the garments meaningful?

2. What factor(s) most influenced your choice of ready-to wear garment?
   a. Price
   b. Brand name,
   c. Garment Fit and Size,
   d. Design and style selection,
   e. Colour
   f. Fabric/Prints
   g. Have not thought of it

   Do you have any specific reasons for the choice(s) you've made?

3. a. What do you know about body shape and body size?
   b. Do you think body shape and size affect one's body image? Reasons
   c. Do you think body shape and size have direct impact on garment fit?

(Present the chart on types of shape for them to make their choices)

4. a. From this chart which of these body shapes best describes your body shape
   b. In your opinion what do you consider as the ideal figure from the chart?
   c. Do you aspire to be a particular body size?
   d. How will that change your body image as compared to your current body size?
5. Have you ever been restricted on the type of clothes you wear because of body shape?
6. a. Which part(s) of your body are you satisfied with and which part(s) are you dissatisfied with

b. Which part of the body does ready-to-wear clothing fit well? Reasons

c. Which specific areas of your body do you identify garment fit problems?

(As a follow up question)

7. Which of the following types of garments fit well on you?
   i) Blouse
   ii) Trouser
   iii) Full Dress
   iv) Skirts

8. a. Have you ever experienced total satisfaction from wearing any ready-in-wear garments?
   b. How did you feel when you put on the garment and what was the occasion?
   c. Could you tell us your experience?

9. a. What do you expect from the local garment manufacturers?
   b. What do you think will enhance garment production in the country?

Conclusion

10. Which of the issues raised would you want the garment manufacturers to address?
11. Let us summarise the key points of our discussion.
12. Final word from each participant

Questionnaire for Participants

Serial number.....
Age:.....
Region by birth.....
Department.....
Year of study:.....

Please choose which one(s) applies to you in order of preference use numbers 1-8 to indicate your choices

a. Price..... (...)
b. Brand name..... (...)
c. Garment Fit and Size..... (...)
d. Design and style selection.... (...)
e. Colour..... (...)
f. Fabric/Prints..... (...)
g. None of the above..... (...)
h. Haven't thought of it..... (...)

How would you describe your weight?

a. Slightly under weight..... (...)
b. Average weight..... (...)
c. Slightly overweight..... (...)
d. Over weight..... (...)

How would you describe your height?

a. Short..... ( )
b. Average..... ( )
c. Tall..... ( )
d. Very Tall..... ( )

5. Which of the following best describe your body size?

a. Extra small..... (...)
b. Small..... (...)
c. Medium..... (...)
d. Large..... (...)
e. Extra Large..... ( )

Vital body measurements

Weight.....
Height.....
Bust.....
Waist.....
Hip.....

I would take this opportunity to thank you all for participating in this discussion.

Appendix J: Questionnaire for Clothing Consumers

Introduction:

I am postgraduate and currently studying for a PhD in the Department of Clothing Design and Technology within the Manchester Metropolitan University. Part of my research involved the evaluation of consumer perception relating to the degree of satisfaction and dissatisfaction with their body shapes and size and their effect on clothing choice.

You are invited to participant in this study. Please take a few minutes to complete this questionnaire. Your valuable contribution will be most appreciated and all information will be treated confidentially. By agreeing to be part of this study means you are giving your consent.

Section A: Satisfaction and Dissatisfaction of Body Areas

Please rate how satisfied or dissatisfied you are with each of the following body parts. Please circle the number that corresponds to your answer choice.

	Body Areas	Very Satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Very Dissatisfied
1	Neck	5	4	3	2	1
2	Shoulders	5	4	3	2	1
3	Arms	5	4	3	2	1
4	Bust	5	4	3	2	1
5	Waist	5	4	3	2	1
6	Abdomen	5	4	3	2	1
7	Hip	5	4	3	2	1
8	Buttocks	5	4	3	2	1
9	Thighs	5	4	3	2	1
10	Legs	5	4	3	2	1
11	Calf	5	4	3	2	1
12	Knee	5	4	3	2	1
13	Weight	5	4	3	2	1
14	Height	5	4	3	2	1
15	Overall appearance	5	4	3	2	1

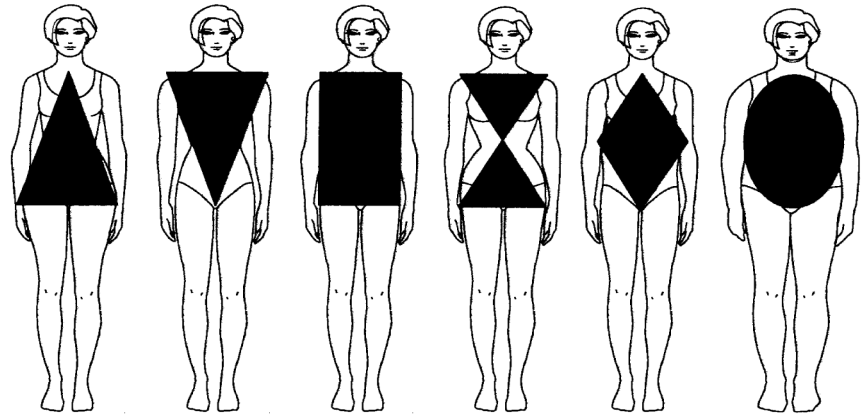
Section B: Clothing Choice

Please circle the number that corresponds with your clothing choice.

	Types of garments	Always	Most of the time	Sometimes	Rarely	Never
16	Loosely fitted dresses (A-line, etc)	5	4	3	2	1
17	Semi- fitted dresses	5	4	3	2	1
18	Fitted dresses	5	4	3	2	1
19	Long length dresses (below the knee)	5	4	3	2	1
20	Short length dresses (above the knee)	5	4	3	2	1
21	Loosely fitted shirts or blouses	5	4	3	2	1
22	Semi fitted shirts or blouses	5	4	3	2	1
23	Fitted shirts or blouses	5	4	3	2	1
24	Long sleeved shirts or blouses	5	4	3	2	1
25	Short sleeved shirts or blouses	5	4	3	2	1
26	Sleeveless shirts or blouses	5	4	3	2	1
27	Trousers with pleats in front	5	4	3	2	1
28	Trousers with flat front (without pleats)	5	4	3	2	1
29	Straight skirts	5	4	3	2	1
30	Full skirts (A-line or gathered).	5	4	3	2	1
31	Skirts above knee length	5	4	3	2	1
32	Skirts below knee length	5	4	3	2	1
33	Clothes with dark coloured fabrics	5	4	3	2	1
34	Clothes with bright coloured fabrics	5	4	3	2	1
35	Clothes with plain fabrics	5	4	3	2	1
36	Clothes with patterned/textured fabrics	5	4	3	2	1
37	Traditional clothes	5	4	3	2	1
38	Ready-to-wear clothes	5	4	3	2	1

Section C: Selection of body shapes

Please tick (√) only one answer from the following questions.



39. Which shape you think is the ideal figure?
    a. Triangle
    b. Inverted triangle
    c. Rectangle
    d. Hourglass
    e. Diamond
    f. Rounded
40. Which of the shape best describe your body shape?
    a. Triangle
    b. Inverted triangle
    c. Rectangle
    d. Hourglass
    e. Diamond
    f. Rounded

41. Which shape do you desire to be?
    a. Triangle
    b. Inverted triangle
    c. Rectangle
    d. Hourglass
    e. Diamond
    f. Rounded

Section D: Background Information:

Please circle the appropriate answer for the following items.

42. What is your age group?
    a. 18-22
    b. 23-27
    c. 28-31
    d. 32-35

43. What is your occupation?
    a. Student/Unemployed
    b. Teacher/Nurse/ Secretary
    c. Businesswoman/Trader
    d. Other Professionals (for example, doctor, engineer, accountant etc)
    e. Other (Specify) _____

44. What is your approximate total monthly family income?
    a. Below ¢400.00
    b. ¢410.00-¢700.00
    c. ¢701.00-¢900.00
    d. ¢901.00-¢1200.00
    e. ¢1200.00-¢1500.00
    f. ¢1501 above

45. What is the highest level of education that you have completed?
    a. Junior /Senior Secondary
    b. Technical/ Vocational/Commercial
    c. Polytechnic
    d. University
    e. Other (Specify) _____

46. What is your marital status?
    a. Single
    b. Married
    c. Separated/Divorced /Widowed

47. How many children do you have?
    a. 1
    b. 2
    c. 3
    d. Other (Specify)
    e. None

48. State the region you come from. ----------

THANK YOU FOR YOUR TIME!!

Appendix K: Photographs of Body Measurements

Figure 1- Neck Girth

Figure 2-Neck to Shoulder

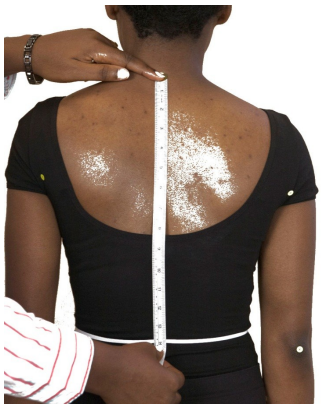


Figure 3- Cervical to Waist

Figure 4- Back shoulder width

Figure 5- Neck Point to Bust Point

Figure 6-Neck Point to Waist Point

Figure 7- Arm Length

Figure 8-Shoulder Point to Elbow

Figure 9 Upper Arm Girth

Figure 10-Elbow Girth

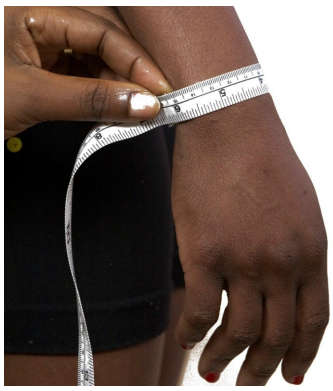


Figure 11-Ankle Girth

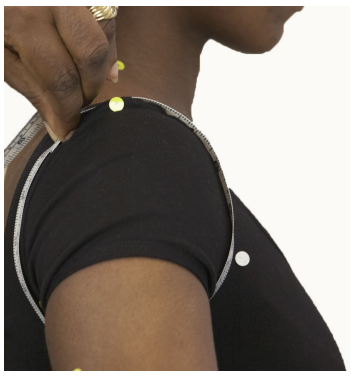


Figure 12 Armscye Girth

Figure 13- Bust Girth

Figure 14-Under Bust Girth

Figure 15-Across Front

Figure 16-Across Back

Figure 17- Waist Girth

Figure 18-Upper Hip Girth

Figure 19-Hip Girth

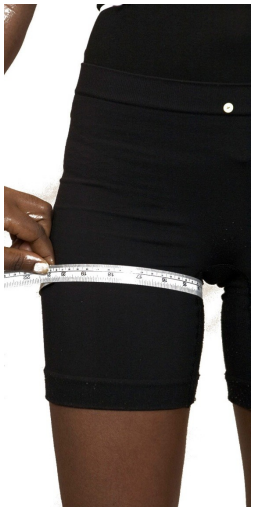


Figure 20-Thigh Girth

Figure 21-Knee Girth

Figure 22 Calf Girth

Figure 23 Ankle Girth

24 Side Waist to Hip

Figure 25 Side Waist to Ankle

Figure 26 Outside Leg Length

Figure 27-Side waist to Knee

Figure 28-Crotch

Figure 29 Weight

Figure 30. Inside Leg Length

Figure 31-Height

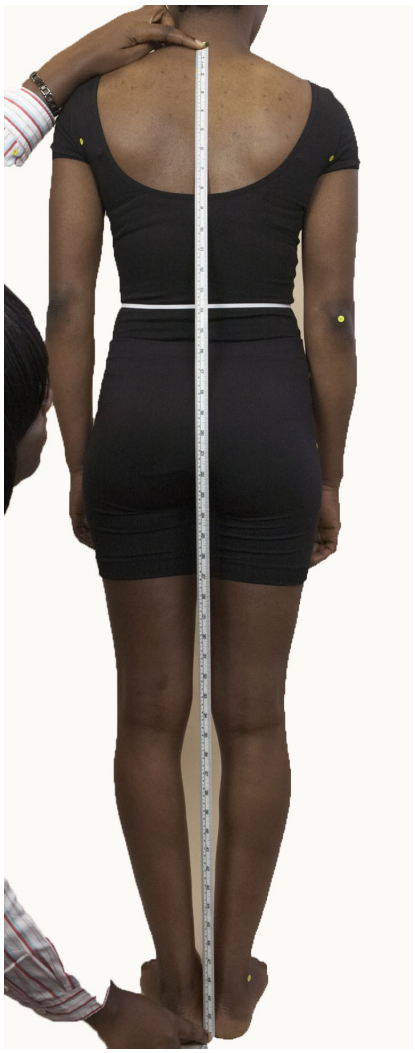


Figure 32-Cervical to Ground

Appendix L: Recording Sheet for Anthropometric Data

a. Subject number.....
b. Age.....
c. Dress size.....
d. Hometown /Region.....

ITEM NO	MEASUREMENTS	1ST READING Metre/centimetre	2ND READING Metre/centimetre
1	Height		
2	Weight		
3	Neck Girth		
4	Cervical to Waist		
5	Cervical to Ground		
6	Neck to Shoulder point		
7	Back Shoulder Width		
8	Front Neck Point to Bust		
9	Front Neck point to Waist		
10	Arm length		
11	Shoulder Point to Elbow		
12	Upper Arm Girth		
13	Armscye Girth		
14	Elbow Girth		
15	Wrist Girth		
16	Bust Girth		
17	Under Bust Girth		
18	Across Front		
19	Across Back		
20	Side waist to Ankle		
21	Side Waist to Knee		
22	Side Waist to Hip		
23	Waist Girth		
24	Upper Hip Girth		
25	Lower Hip Girth		
26	Knee Girth		
27	Thigh Girth		
28	Calf girth		
29	Ankle Girth		
30	Inside Leg Length		
31	Crotch Length		
32	Outside Leg Length		

Appendix M: SPSS ANOVA Results

Income and Body Cathexis

The results from ANOVA test showed that for abdomen there was significant difference between respondents (F=2.472, p≤0.05) and for height (F=2.504, p≤0.05). Though the ANOVA test showed some significant difference of the abdomen and height between the income groups, post hoc Scheffe test showed no significant difference within the groups.

Table 1 Mean and Standard Deviation of Monthly Income of Respondents

Variables	Mean Score of Monthly Income of Respondents						F-Value	P
	Below 400.00	401.00-700.00	701.00-900.00	901.00-1200.00	1201.00-1500.00	Above 1500.00		
Neck	4.43	4.31	4.29	4.53	4.40	4.39	.659	.655
Shoulder	4.13	4.25	4.12	4.19	4.30	4.22	.309	.907
Arm	4.14	4.21	4.24	4.15	4.03	3.92	1.192	.313
Bust	4.27	4.11	4.27	4.06	4.05	4.11	.559	.731
Waist	4.19	3.93	4.15	3.92	4.28	3.84	1.817	.109
Abdomen	3.80	3.49	3.66	3.49	3.78	3.20	2.472	.032
Hip	4.24	4.30	4.34	4.28	4.18	4.23	.202	.961
Buttocks	4.11	4.15	4.05	4.15	3.85	4.05	.623	.682
Thighs	4.24	4.26	4.18	4.04	4.08	4.16	.608	.694
Legs	3.90	4.21	4.03	4.11	4.08	3.89	1.092	.365
Calf	4.00	3.84	3.90	4.02	4.05	4.08	.625	.681
Knee	4.03	3.93	3.88	3.94	4.03	4.05	.249	.940
Weight	3.86	3.84	3.98	3.57	4.03	3.55	1.891	.095
Height	4.29	3.84	4.22	3.79	3.78	4.01	2.504	.030
Overall Appearance	4.33	4.34	4.39	4.06	4.22	4.25	.932	.460

*p≤0.05, ** ≤0.*≤0.05, **≤ 0 .01 *** ≤0.001

Occupation and Body Cathexis

The One-way analysis of variance (ANOVA) test did not show any significant difference between the groups. Post hoc test was therefore not performed. (See

Table 2 Mean and Standard Deviation for Occupational Groups and Body Cathexis

Variables	Mean Score of Occupation					F-Value	P
	Students/ Unemployed	Professionals	Secretary/ Clerk	Business women	Other Jobs		
Neck	4.38	4.41	4.48	4.42	4.37	.149	.964
Shoulder	4.14	4.27	4.32	3.97	4.43	1.606	.172
Arm	4.13	3.84	4.09	4.12	4.17	.675	.609
Bust	4.13	4.24	4.06	4.12	4.27	.346	.847
Waist	4.12	3.95	3.80	3.88	3.95	1.224	.300
Abdomen	3.57	3.56	3.32	3.76	3.20	1.121	.346
Hip	4.23	4.31	4.16	4.27	4.33	.241	.915
Buttocks	4.01	4.29	4.20	4.09	3.83	1.976	.098
Thighs	4.13	4.23	4.16	4.15	4.07	.266	.900
Legs	4.03	3.94	3.73	4.40	4.07	1.783	.132
Calf	3.96	4.06	4.00	3.97	4.17	.439	.781
Knee	3.98	4.04	4.32	3.73	4.10	1.445	.219
Weight	3.81	3.71	3.48	3.91	3.73	.677	.608
Height	4.01	4.08	3.72	3.97	3.80	.800	.526
Overall Appearance	4.31	4.23	4.32	3.97	4.3	1.158	.329

*p≤0.05, ** ≤0.01 *** ≤0.001

Education and Body Cathexis

Table 3 Mean of Educational groups and Body Cathexis

Variables	Mean Score of Educational Groups					**F-Statistic**	**P**
	Junior/ Senior	Tech/ Voc/Com	Polytechnic	University	Others		
Neck	4.39	4.41	4.35	4.42	4.59	.451	.772
Shoulder	3.99	4.00	4.20	4.32	4.53	2.641	.034*
Arm	4.00	4.09	4.15	4.06	4.24	.424	.791
Bust	4.13	3.78	4.17	4.13	4.41	1.484	.206
Waist	4.01	4.16	4.07	3.86	4.47	1.929	.105
Abdomen	3.59	3.50	3.64	3.34	3.82	1.282	.276
Hip	4.34	4.34	4.25	4.23	4.41	.588	.672
Buttocks	4.13	3.97	4.03	4.11	4.29	.481	.750
T highs	4.00	4.09	4.26	4.13	4.12	1.206	.308
Legs	3.78	3.94	4.09	4.07	3.94	1.335	.256
Calf	3.97	3.66	4.02	4.10	4.00	1.512	.198
Knee	3.96	3.84	3.97	4.10	4.18	.702	.591
Weight	3.83	3.81	3.85	3.56	4.06	1.515	.197
Height	4.00	3.66	4.03	3.95	4.41	1.536	.191
Overall Appearance	4.23	4.00	4.29	4.	4.76	2.199	.069

*p≤0.05, ** ≤0.01 *** ≤0.001
Tech-Technical, Com-Commercial &Voc-Vocational

Semi -Fitted Dresses

The results from ANOVA test showed significant difference between the responses for buttock (F=2.761, p≤0.05) as shown Table 4

Table 7.11: Results of ANOVA test on Body Cathexis and Semi Fitted Dresses

Variables	Mean Scores of Clothing Choice (Semi Fitted Dresses)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.52	4.35	4.40	4.38	4.44	.460	.765
Shoulder	4.34	4.11	4.24	4.00	4.56	1.485	.206
Arm	4.20	3.94	4.24	4.00	3.89	2.324	.056
Bust	4.23	4.05	4.19	4.04	4.00	.591	.669
Waist	3.95	3.94	4.18	3.73	3.89	1.929	.105
Abdomen	3.66	3.58	3.49	3.46	3.33	.296	.880
Hip	4.36	4.23	4.31	3.96	4.11	1.116	.349
Buttocks	4.11	4.12	4.13	3.50	3.89	2.761	.028*
Thighs	4.18	4.23	4.13	3.88	4.00	1.044	.384
Legs	3.98	4.05	4.01	3.81	4.11	.375	.826
Calf	4.07	3.96	4.04	4.04	3.67	.515	.724
Knee	4.05	3.91	4.04	3.85	4.00	.293	.883
Weight	3.91	3.71	3.78	3.69	3.56	.307	.873
Height	4.30	3.94	3.96	4.04	3.67	1.227	.299
Overall Appearance	4.32	4.18	4.34	4.24	4.11	.749	.559

*p≤0.05, ** p≤0.01, *** p≤0.001

Skirts below the Knee

The results from ANOVA test showed significant difference in the abdomen (F=2.566, p≤ 0.05) and height (F=2.763, p≤0.05) as shown in Table 7.22.

Table 7.22: Results of ANOVA Test on Skirt below the Knee

Variables	Mean Score of Clothing Choice (Skirt Below the Knee)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Waist	4.16	4.09	4.06	3.68	3.72	2.320	.056
Abdomen	3.55	3.58	3.62	3.59	2.86	2.566	038*
Hip	4.32	4.32	4.26	3.92	4.24	1.593	.176
Buttocks	4.14	4.02	4.11	4.11	4.03	.239	.916
Thighs	4.20	4.18	4.21	3.97	3.90	1.324	.260
Legs	4.04	4.03	4.08	3.86	3.72	.984	.416
Calf	4.18	3.95	4.02	3.84	4.00	.942	.442
Knee	4.25	3.94	4.00	3.84	4.00	1.282	.760
Weight	3.71	3.90	3.84	3.43	3.41	2.139	.075
Height	4.02	4.16	3.83	3.73	4.31	2.763	.027*

*p≤0.05, ** p≤0.01, ***p ≤0.001

Straight Skirts

The results from ANOVA test showed significant difference in weight (F=2.497, p≤0.05). No statistical difference was revealed when the Post hoc Scheffe test was conducted for the table.

Table 7.44: Results of ANOVA Test on Straight Skirts

Variables	Mean Score and Standard Deviations of Straight skirt					F=Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		.
Waist	4.20	4.14	3.99	3.94	3.80	1.361	247
Abdomen	3.86	3.58	3.58	3.27	3.39	1.790	.130
Hip	4.51	4.24	4.29	4.11	4.07	1.841	.120
Buttocks	4.27	4.06	4.11	4.06	3.83	1.183	.318
Thighs	4.38	4.18	4.19	3.97	3.98	2.064	.085
Legs	4.07	4.07	4.061	3.68	4.12	2.089	.082
Calf	4.18	3.99	3.99	4.02	3.85	.707	.588
Knee	4.09	3.91	4.08	3.90	3.98	.658	.622
Weight	4.11	3.68	3.87	3.58	3.51	2.497	.042*
Height	4.18	4.07	4.05	3.81	3.61	2.316	.057

Semi Fitted Shirts and Blouses

The results from ANOVA test showed no significant difference between the selected body areas and semi fitted shirts and blouses. No further test was conducted for the table.

Table 7.32: Results of ANOVA Test on Semi Fitted Shirts and Blouses

Variables	Mean Score and Standard Deviations of Semi Fitted Shirt and Blouse					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.45	4.46	4.31	4.48	4.14	1.245	.292
Shoulder	4.38	4.20	4.11	4.35	3.86	1.663	.158
Arm	4.38	4.10	3.98	4.04	4.00	1.880	.113
Bust	4.00	4.21	4.08	4.09	4.21	.666	.616
Weight	3.73	3.79	3.69	3.91	3.93	.341	.851
Height	4.30	4.01	3.86	3.87	3.79	1.865	.116

*p≤0.05, **p ≤0.01 *** p≤0.001

Fitted Shirts and Blouses

The results from ANOVA test showed there was significant difference between the bust and fitted shirt and blouse (F=3.324, p≤0.05). The post hoc test showed no statistical significance difference for the table

Table 7.34: Results of ANOVA Test for Fitted Shirts and Blouses

Variables	Mean Score of Fitted Shirts and Blouses					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.45	4.39	4.44	4.11	4.28	1.273	.280
Shoulder	4.20	4.18	4.24	4.07	4.17	.229	.922
Arm	4.18	4.12	4.13	3.81	3.67	1.868	.115
Bust	4.29	4.19	4.07	3.67	3.72	3.324	.011*
Weight	3.90	3.72	3.71	3.56	3.89	.796	.529
Height	4.05	4.02	4.05	3.59	3.61	1.672	.156

*p≤0.05, ** p≤0.01 *** p≤0.001

Table 7.28: Results of ANOVA test on Body Cathexis and Ready-to-Wear (RTW)

Variables	Mean Scores of Clothing Choice (Ready-to-Wear)					F-Value	P
	Always	Most of the Time	Sometimes	Rarely	Never		
Neck	4.34	4.50	4.30	4.33	4.47	1.246	.291
Shoulder	4.13	4.25	4.22	4.00	4.27	.665	.617
Arm	4.12	4.04	4.17	4.22	3.73	1.021	.396
Bust	4.22	4.04	4.32	3.78	3.67	3.305	.011*
Waist	4.04	4.04	4.09	3.96	3.47	1.349	.251
Abdomen	3.44	3.72	3.48	3.48	3.07	1.599	.174
Hip	4.37	4.22	4.31	4.22	3.47	3.698	.006**
Buttocks	4.23	4.12	4.08	3.67	3.47	3.554	.007**
Thighs	4.32	4.07	4.23	3.93	3.67	3.307	.011*
Legs	4.18	3.81	4.15	3.89	4.00	2.736	.029*
Calf	4.18	3.88	3.94	4.30	3.80	2.564	.038*
Knee	4.12	3.94	3.94	4.15	3.93	.756	.555
Weight	3.77	3.70	3.90	3.74	3.47	.727	.574
Height	3.91	4.03	4.12	4.00	3.20	2.607	.035*
Overall Appearance	4.31	4.27	4.23	4.26	4.07	.301	.877

*p≤0.05, ** p≤0.01, ***p ≤0.001

Marital Status and Clothing Choice

ANOVA results show there were relationships between marital groups and clothes with bright coloured fabrics (p≤0.001) as shown in Table 7.33

Table 7.33: Results of ANOVA test on Clothing Choice and Marital Status

Variables	Mean Scores of Marital Status			F-Value	P
	Not Married	Married	Divorced/ Widowed/ Separated		
Loosely Fitted Dresses	3.22	3.46	3.83	2.644	.072
Semi Fitted Dresses	3.47	3.54	3.50	.290	.748
Fitted Dresses	3.63	3.54	3.50	.248	.781
Long Length Dresses	3.39	3.22	4.00	2.086	.126
Short Length Dresses	3.34	3.15	2.83	1.600	.203
Loosely Fitted Shirts/ Blouses	3.12	3.24	3.83	1.715	.181
Semi Fitted Shirt/ Blouses	3.60	3.52	3.67	.293	.746
Fitted Shirts or Blouses	3.79	3.69	3.17	1.202	.302
Long Sleeved Shirt or Blouses	3.07	3.20	2.33	2.259	.106
Short Sleeve Shirts or Blouses	3.78	3.78	3.00	1.862	.157
Sleeveless Shirts or Blouses	3.26	3.30	2.67	.783	.458
Trousers with Pleats in Front	2.18	2.41	2.50	1.584	.206
Trousers with Flat Front	3.33	3.19	2.67	1.211	.299
Straight Skirt	3.04	3.21	2.67	1.352	.260
Full Skirts	3.12	3.17	2.83	.290	.748
Skirts Above Knee Length	3.22	3.06	3.00	.823	.440
Skirts below Knee Length	3.30	3.43	3.67	.870	.420
Clothes with Dark C fabrics	3.12	3.24	2.67	1.348	.261
Clothes with BC fabrics	3.80	3.46	3.00	6.742	.001***
Clothes with Plain Fabrics	3.56	3.56	3.17	.496	.610
Clothes with P/T Fabrics	3.55	3.38	3.00	2.159	.117

*p ≤0.05, ** p≤0.01, *** p≤0.001

Childbirth Status and Clothing Choice

ANOVA test results indicated statistically significant difference between childbirth groups and clothes with bright coloured fabrics (4.378, p≤0.001) loosely fitted shirts or blouses (F=3.144, p≤0.05), semi fitted shirt or blouses (F=2.572, p≤0.05) and skirts above knee length (F=2.621, p≤0.05) and as shown in Table 7.35.

Table 7.35: Results of ANOVA Test for Childbirth Status

Variables	Mean Score of Birth Status					F-Value	P
	1	2	3	Other specify	None		
Loosely Fitted Dresses	3.26	3.64	3.51	3.36	3.23	1.739	.141
Semi Fitted Dresses	3.53	3.36	3.54	3.64	3.51	.437	.782
Fitted Dresses	3.58	3.40	3.63	3.43	3.65	.502	.734
Long Length Dresses	3.47	3.23	3.17	3.64	3.35	.669	.614
Short Length Dresses	3.47	2.77	3.11	3.21	3.35	3.144	.015*
Loosely Fitted Shirt/ Blouses	3.36	3.04	3.65	3.29	3.08	2.572	.038*
Semi Fitted Shirt/Blouses	3.58	3.40	3.86	3.29	3.58	1.509	.199
Fitted Shirts or Blouses	3.70	3.60	3.74	3.36	3.80	.846	.497
Long Sleeved Shirt/Blouses	3.23	3.30	3.09	2.93	3.06	.757	.554
Short sleeve Shirt/Blouses	4.05	3.49	3.83	3.57	3.77	1.969	.099
Sleeveless Shirts or Blouses	3.05	3.38	3.34	2.71	3.30	1.233	.296
Trousers with Pleats in Front	2.42	2.23	2.63	2.57	2.18	1.369	.244
Trousers with Flat Front	3.28	3.21	3.29	2.93	3.31	.323	.863
Straight Skirt	3.28	3.11	3.03	2.64	3.11	.876	.478
Full Skirts	3.19	3.32	3.06	3.07	3.11	.409	.802
Skirts Above Knee Length	3.31	2.87	2.83	2.71	3.28	2.621	.035*
Skirts below Knee Length	3.63	3.23	3.40	3.14	3.34	.986	.415
Clothes with DC Fabrics	3.09	3.47	3.06	3.00	3.14	1.407	.231
Clothes with BC Fabrics	3.81	3.20	3.66	3.23	3.76	4.378	.002***
Clothes with plain Fabrics	3.49	3.50	3.66	3.64	3.57	.221	.926
Clothes with P/T Fabrics	3.56	3.43	3.49	3.29	3.50	.255	.906

*p ≤0.05, **p≤0.01, *** p≤0.001

Clothing Choice and Body Shape

ANOVA test indicate only one significant difference for clothes with plain fabrics (F=3.040, p≤0.05). The post hoc Scheffe test did not show any significant difference within the groups.

Satisfaction with Arms

ANOVA test results indicated statistically significant difference between the arms and sleeveless shirt /blouses (F=2.408, p≤0.05).

Table 7.8: Results of ANOVA Test on Satisfaction with Arms

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied nor Dissatisfied	Dissatisfied	Very dissatisfied		
Long Sleeved S/Blouses	3.27	3.07	2.96	2.63	3.00	1.737	.141
Short Sleeved S/Blouses	3.87	3.75	3.52	3.95	3.33	2.126	.077
Sleeveless S /Blouses	3.29	3.41	2.87	3.16	2.67	2.408	.049*

*p≤0.05, * *p≤0.01 ***p≤0.001

Table 7.44: Results of ANOVA Test on Clothing Choice and Body Shape

Variables	Mean Scores of Clothing Choice and Body Shape						F-Value	P
	Triangle	triangleInverted	Rectangle	Hourglass	Diamond	Rounded		
Loosely Fitted Dresses	3.21	3.20	3.22	3.37	3.94	3.00	1.770	.118
Semi Fitted Dresses	3.50	3.80	3.35	3.48	3.59	3.64	.631	.677
Fitted Dresses	3.67	3.07	3.52	3.65	3.47	3.08	1.317	.256
Long Length Dresses	3.23	2.93	3.78	3.39	3.18	3.64	1.677	.139
Short Length Dresses	3.13	3.53	3.35	3.36	2.94	3.21	1.093	.364
Loosely Fitted Shirt/ Blouses	3.22	3.00	3.27	3.16	3.41	2.64	1.001	.417
Semi Fitted Shirt/Blouses	3.58	3.71	3.52	3.57	3.35	3.64	.278	.925
Fitted Shirt or Blouses	3.76	3.80	3.78	3.79	3.29	3.43	.913	.473
Long Sleeved Shirt/Blouses	2.94	3.33	3.09	3.21	3.41	2.71	1.735	.126
Short sleeve Shirt/Blouses	3.67	3.47	4.00	3.85	3.64	3.59	1.231	.294
Sleeveless Shirts or Blouses	3.27	3.20	3.39	3.31	2.65	3.21	.990	.424
Trousers with Pleats in Front	2.20	2.13	2.48	2.27	2.41	2.43	.333	.893
Trousers with Flat Front	3.39	3.60	3.68	3.18	2.82	3.07	1.563	.170
Straight Skirt	3.10	3.07	3.04	3.12	3.12	2.69	.358	.877
Full Skirts	3.20	3.50	3.35	3.09	2.94	2.71	1.049	.389
Skirts Above Knee Length	3.05	3.27	3.50	3.25	2.76	2.86	1.374	.233
Skirts below Knee Length	3.35	3.60	3.26	3.39	3.06	3.14	.596	.703
Clothes with DC Fabrics	3.02	3.07	3.22	3.25	2.94	3.36	1.182	.317
Clothes with BC Fabrics	3.55	3.40	4.09	3.74	3.53	3.50	1.877	.097
Clothes with plain Fabrics	3.33	3.66	3.68	3.68	3.35	4.07	3.040	.011*
Clothes with P/T Fabrics	3.35	3.67	3.59	3.57	3.00	.893	2.232	.051

*p≤0.05, ** ≤0.01 *** ≤0.001

Satisfaction with Bust

ANOVA test results indicated statistically significant difference between the bust and loosely fitted shirt / blouses (F=3.593, p≤0.01) and fitted dresses (F=2.505, p≤0.05). Post hoc showed no significant difference within the groups.

Table Results of ANOVA Test on Satisfaction of Bust

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	N. Satisfied N Dissatisfied	Dissatisfied	Very Dissatisfied		
Loosely Fitted Dresses	3.26	3.37	3.33	3.50	3.25	.197	.940 .
Semi Fitted Dresses	3.51	3.49	3.52	3.47	3.50	.032	998
Fitted Dresses	3.70	3.68	3.14	3.33	3.25	2.505	.042*
Loosely Fitted S/Blouses	3.15	3.21	3.15	3.10	3.50	3.593	.007**
Fitted Shirt/ Blouses	3.88	3.81	3.33	3.40	3.00	.194	.941
Semi Fitted Shirt/Blouse	3.54	3.64	3.48	3.50	4.00	.604	.660

*p≤0.05, * *p≤0.01 ***p≤0.001

Satisfaction with Buttocks

ANOVA test results indicated statistically significant difference between the buttocks and trousers with flat front (F=2.636, p≤0.05) and fitted dresses (F=3.952, p≤0.01). Post hoc revealed no significant difference within the groups.

Table 7.11: Results of ANOVA test on Satisfaction with Buttocks

Variables	Mean Scores					F-Value	P
	Very Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Very Dissatisfied		
Trousers with Pleats in Front	2.28	2.31	2.23	2.03	2.33	.334	.855
Trousers with Flat Front	3.44	3.19	3.32	2.71	4.00	2.636	.034*
Loosely Fitted Dresses	3.26	3.37	3.27	3.42	3.00	.324	.862
Semi Fitted Dresses	3.52	3.54	3.56	3.13	3.00	1.831	.122
Fitted Dresses	3.68	3.73	3.15	3.19	4.67	3.952	.004**
Straight skirts	3.14	3.13	3.17	2.68	2.33	1.519	.196
Full skirts	3.08	3.12	3.44	3.03	2.67	1.104	.354

*p≤0.05, * *p≤0.01 ***p≤0.001

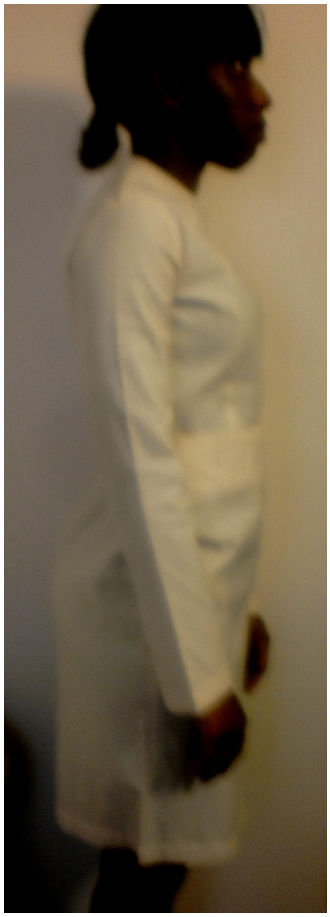
Appendix N: Fit Assessment Sheet

	Observations		
Body Dimensions	**Good Fit**	**Poor Fit**	**Causes of Poor Fit**
Neckline Position			
Shoulder Length			
Bust Girth			
Across Chest			
Across Back			
Waist Girth			
Waist Position			
Front Waist Length			
Centre Back Length			
Lower Hip Girth			
Upper Arm Girth			
Acromion to Wrist			
Wrist Girth			
Side Waist to Knee			
Side Waist to Ankle			
Thigh Girth			
Side waist to Ankle			
Inside Leg Length			
Crotch			

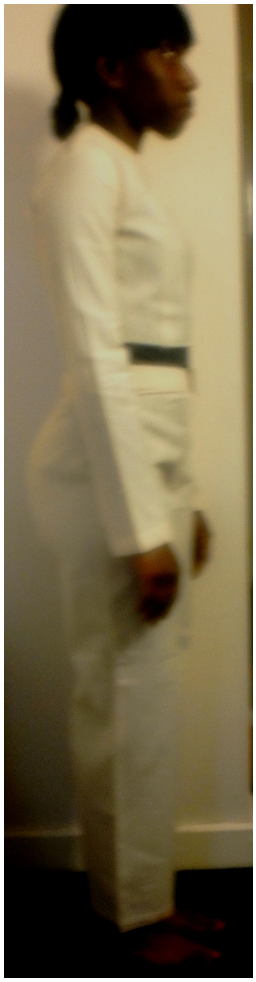
Appendix O: Fit Trial Garments

Back View

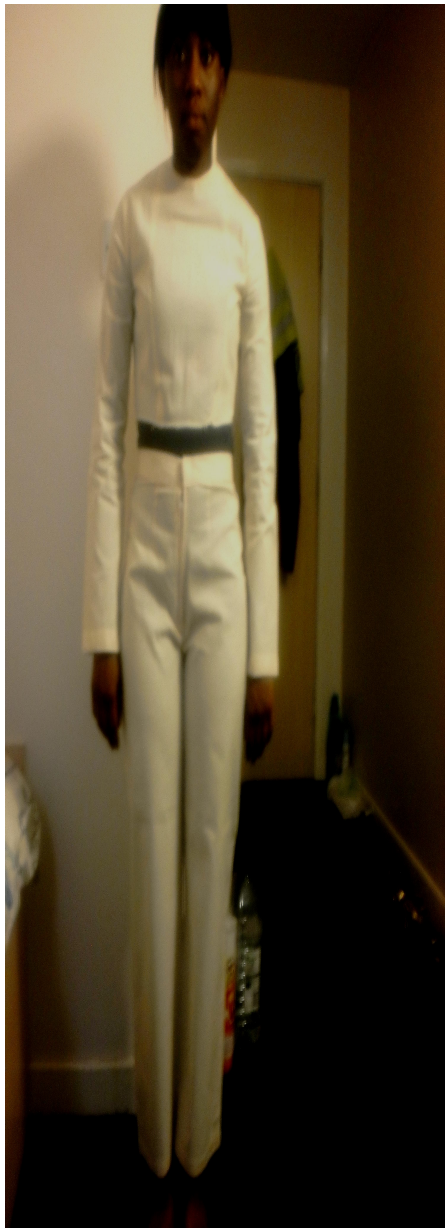
Front View



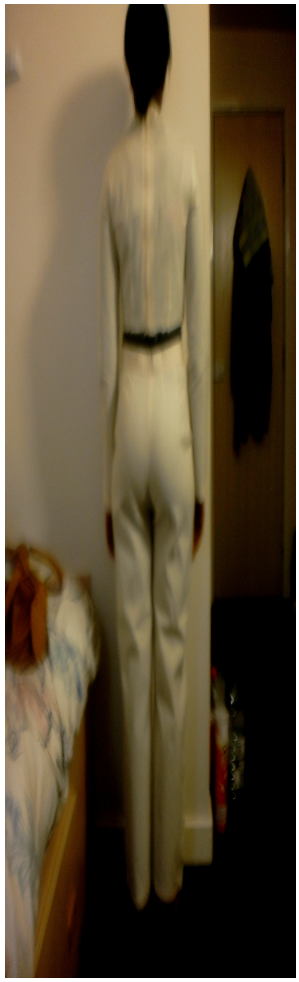
Side View



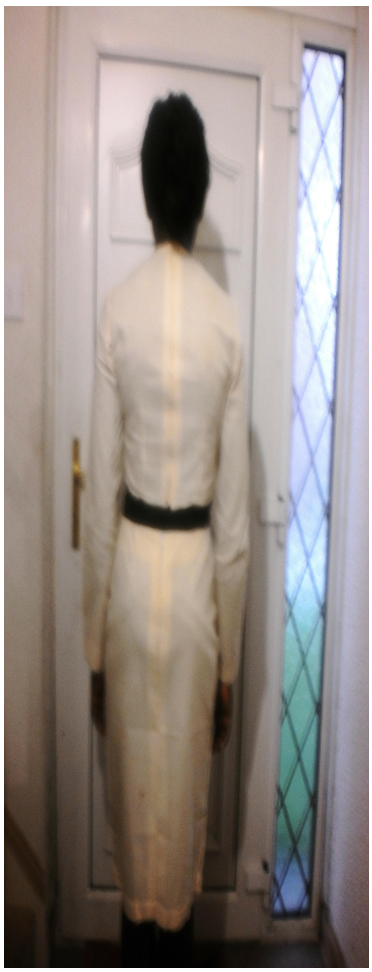
Side View



Front View

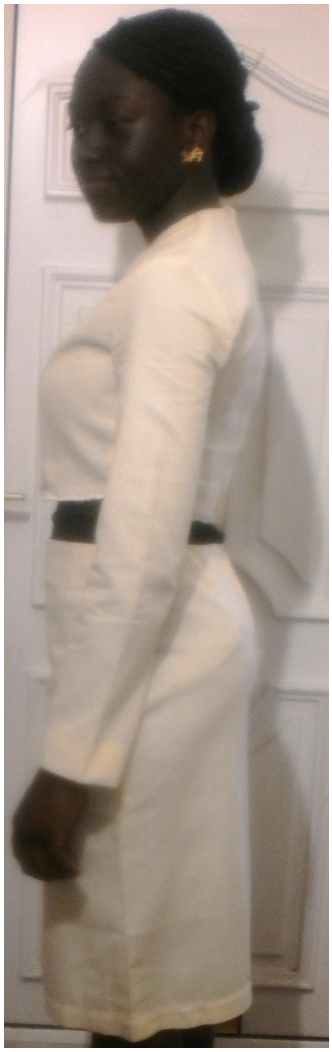


Back View



Back View

Front View



Side View

Appendix P-Glossary

Definition of Terms	
Anatomical Position	
Anthropometry	This refer to the measuring of people in order to determine their body size and shape (Pheasant, 1996; Roebucks, 2005)
Ease Allowance	It is the difference in space between the garment and the body taken into account the pattern by increasing the area along body's outline
Girth	
Key dimension	it is body dimension, which are used to designate a garment size
Landmark	Landmark is use to identify the key points which ease the errors in collection of anthropometric data
Measurer	The person who takes the body measurements of a subject
Recorder	The person who records the body measurements
Subject	The person who is being measured. In the current study, women aged 16-35 years were the subjects

Appendix Q: Abbreviations

Abbreviations	Full Meaning of Abbreviations

AGI	Association of Ghana Industries
AGOA	African Growth opportunity Act
ASTM	American Standard Testing Materials
ATL	Akosombo Textiles Ltd
BSI	British Standard Institution
DIP	District Industrialisation Programme
ERP	Economic Recovery Programme
ECOWAS	Economic Community of West African States
GEDC	Ghana Enterprise Development Commission
GSS	Ghana Statistical Service
GTP	Ghana Textile Printing
GTMC	Ghana Textile Manufacturing Company
PSD	Private Sector Development
PSI	Presidential Special Initiative
GDP	Gross Domestic Products
IPC	Investment Promotion Centre
GSB	Ghana Standard Board
ISIC	International Standard Industrial Classification
ISO	International Organisation for Standardisation
ISSP	Industrial Sector Support Programme
IMF	International Monetary Fund
JICA	Japan International cooperation
RTW	Ready-To-Wear
MMU	Manchester Metropolitan University
MSME	Micro Small and Medium Enterprises Project
MOTI	Ministry of Trade and Industry
NBSSI	National Board for Small Scale Industries
NDPC	National Development Planning Commission
SME	Small and Medium Enterprises
TGTC	Textile and Garment Trading Centre
UNIDO	United Nation Industrial Development Organisation

Appendix R: Published Paper

Development of a Sizing System for Ghanaian Women: A conceptual Framework for Ready-to-Wear Clothing for Manufacturing Strategies. A poster presentation at the TI Centenary Conference, Manchester- England, 3rd and 4th November 2010.

Development Of A Sizing System For Ghanaian Women For The Production Of Ready-To-Wear Clothing, an Oral Presentation at the 88th World Conference in Malaysia TI Conference, Malaysia, 15th May 2012.